Vel VI, No. 6

JUNE, 1951

# AGRICULTURAL CHEMICALS



In This leaves

Annual USDA Fertilizer Consumption Report • Dr. Decker's Testimony before Delaney Committee
Pesticide State Laws • NFA and APFC hold Annual Meetings • TCA Herbicides • Pesticide
Hazards • Need For Continued Research (Guest Editorial) • NACA Information Committee Guest
Hazards • Need For Continued Research (Guest Editorial) • NACA Information Committee Guest

S. Carelina Fertilizer Test



### ... THROUGH NEWER INSECTICIDES

When new insecticides are developed — like Heptachlor, Dilan, Parathion, Aldrin, Dieldrin, etc. — they must pass exacting examinations by government authorities, and then go on to the final test: — Acceptance by the trade and the ultimate user.

This last test hinges on factors such as everyday risk of handling, ease of application, cost, availability, etc.

We are constantly investigating all new insecticide developments, and all the factors which apply to their use on a broad scale — another way in which Powell serves the independent insecticide formulator.



### John Powell & Co., Inc.

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Solas Offices: Philodelphia • Pithburgh • Hustivilla • Chicago • Fart Worth • Darver • Son Francisco Conada: Charles Albert Smith, Ltd., Toronio, Maniteal • Argenting: John Powell y Cla Representatives in Principal Cities of the World

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# non-abrasiveness . . . pronounced ATTACLAY

LABORATORY and other comparisons of Attaclay-extended dusts indicate their lack of abrasiveness. This spells savings to finished dust blenders and their grower-customers—savings in time, machine parts and money.

For the grower, Attaclay used as extender means trouble-free dusting and longer rig life. Fan casings, blades, tube bends, nozzles—all vulnerable friction points—receive insignificant wear. And Attaclay-mixed dusts are noted for their ability to flow, disperse, settle, cover, adhere and kill.

Blenders of finished dusts rate a major slice of advantages, too. For in addition to turning out dusts which please their customers, they annex all the savings accruing from the use of a highly sorptive, free-flowing material that eases many blending steps—that holds wear and tear on mixing machinery to a minimum.

Arraclay's compatibility with the range of commercially-applied toxic agents is well proven. In fact, many of the good points that make it the overwhelming choice of dust base producers will work equally well to insure success in the extending and dusting phases.

We'll be glad to send you a generous sample and assist on problems which might exist.

ATTAPULGUS CLAY COMPANY

Dant. P. 210 Wast Washington Square, Philip. S. Po.



### The spotlight is on "The Perfect Topdresser"

Cal-Nitro\* has a guaranteed nitrogen content of 20.5%. It supplies crops the nitrogen they need at low cost.

Cal-Nitro has half nitrate nitrogen and half ammonia nitrogen. Both forms are quick-acting — and the ammonia form is also long-lasting, because it resists leaching.

▼ Cal-Nitro contains the equivalent of about 9% Calcium Oxide and 7% Mag-

nesium Oxide - both of which are essential to vigorous growth.

The soil reaction of Cal-Nitro is neutral
—it does not increase or decrease soil
acidity, or measurably change pH values.

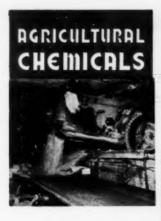
Cal-Nitro is in free-flowing pellet form easy to apply by hand or machine. It "rattles off the leaves", reducing foliage burn to a minimum.

"The Synthetic Nitrogen Products Corporation owns the trade-mark "Cal-Nitro", which is used to designate a nitrogen fertilizer compound.

SYNTHETIC NITROGEN PRODUCTS CORPORATION, 285 MADISON AVENUE, NEW YORK 17, N. Y.

Better in all ways ... for all crops ...





### A Monthly Magazine For the Trade

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#### THIS MONTH'S COVER

Modern methods of mining potash assure a constant supply of this essential fertilizer ingredient to keep pace with increasing demand. Here is a scene in potash mine of U. S. Potash Co. in New Mexico. (Photo by American Plant Food Council).

> VOL. VI No. 6 1951 JUNE

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Industry News

Subscription Rates: One year, United States, \$3.00; Canada and Pan American countries, \$4.00; Foreign, \$5.00. Published monthly on the 15th by Industry Publications, Inc. Wayne E. Dorland, President; Ira P. MacNair, Secretary-Treasurer. Publication office, 123 Market Place, Baltimore 2, Md. Advertising and editorial office 254 W. 31et St., New York 1, New York—Chicago Office, 333 N. Michigan Blvd. Advertising rates made known on application. Closing date for copy— 20th of the month previous to date of issue.

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SURE, OPERATO
CHEMICAL CORP. OF
SOURCE FOR ME FOR T
INSECTICIDES AND
AND ALL OTHER FINE COLO
AND



AGRICULTURAL CHEMICALS, INSECTICIDES
AND WEED KILLERS IN EMULSIONS,
DUSTS AND SOLUTIONS—ALONE OR IN
ANY COMBINATIONS

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WEEDKILLERS—
RADO .44 FORMULATIONS
COMBINATIONS!



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Call long distance now—Denver, Colorado, AComa 5895—for famous, finer-formulation Colorado .44 agricultural chemicals. Our supplies are short, too, but we will do everything possible to take care of your needs. The Colorado .44 line of agricultural chemicals and the new household small package line are fast turnover items for dealers because of Colorado .44 national advertising in Cappers Farmer and newspapers—and because we furnish complete display and advertising materials! Phone or wire collect now—or mail the coupon now!

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Yes, I'm interested in the Colorado .44 line. Send complete details.

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City State

# Doing one job well for over 90 years...

# MANUFACTURING PAPER BAGS

### Recent Products from the A & S Packaging Laboratory

SHUR-CLOSE VALVE—Tests made in plants all over the country have proved that SHUR-CLOSE valve bags insure less dusting when packing and less sifting when packed. Consumers are requesting shipments in SHUR-CLOSE valve bags because they prevent waste; while operating men in packing rooms claim SHUR-CLOSE bags eliminate objectionable dust.

STA-STAK BAG— It's the specially designed outer creped sheet that does the trick. STA-STAK creped paper takes the skid and slip out of pilling, stacking and palletizing. The STA-STAK construction gives greater resiliency to withstand shocks and general abuse better than ordinary multiwall bags. And they handle easier . . the crinkly surface provides a handhold that workmen appreciate.

SUPER-GLOSS FLOUR BAG—The SUPER-GLOSS flour bag was developed by the A&S packaging laboratory with the help of the country's largest mills: The long fibered white kraft sheet combined with a blue kraft liner makes the toughest 25 lb. flour bag on the market. The SUPER-GLOSS clay coated sheet gives this bag exceptional whiteness and keeps ink on the surface, producing a sparkling, appealing shelf package.

ARK-TONE PRINTING—A&S has also perfected developments kindred to the field of paper bag making. The new A&S ARK-TONE PRINTING is a case in point. No other commercial bag printing can touch this ARK-TONE process for printing fidelity. Users report increased sales of ARK-TONE printed bags because strong, sharp, clear colors give package greater shelf appeal. ARK-TONE process printing is the only type of commercial bag printing to combine product reproduction and color brightness.

PLASTO-PAK BAG—This is the very latest development from the A&S packaging laboratory. PLASTO-PAK bags have a polyethylene kraft liner which affords completely moisture-proof protection to hygroscopic materials. Many acids and other strong chemicals when packed in the PLASTO-PAK bag, fail to attack the liner. A special "Electro-Scal" (patent applied for) closes off the needle holes at the bottom of the bag... no other multiwall has this feature.

Y OU don't build a good name overnight. It only comes as the result of doing a good job for a long time. After that, people begin to expect quality workmanship from you and bring their business to you for that reason.

Since 1859, we have been building a fine reputation throughout American industry and are proud of our claim ... "The oldest name in paper bags." Styles and designs can be copied, but the integrity of a company and the quality built into its products cannot be imitated.

CANAJOHARIE, N. Y.

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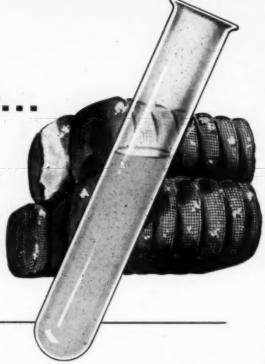
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Ashcraft-Wilkinson's reputation as a reliable source of agricultural chemicals has been well knewn to the trade for over forty years. Now, as in 1910, the products we distribute must be of highest quality certified in our own laboratory for purity, content and strength.

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Across the country manufacturers are turning to Terra-Lite brand vermiculite Conditioner to help solve their production problems, for with this free-flowing mineral, manufacturers can suit their own schedule of deliveries, month by month, too meet their needs throughout the year. Your production schedule can be maintained, if you use TERRA-LITE, for it is immediately available from a plant near you, at uniform high quality and a stable price!

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Terra-Lite Conditioner is highly absorbent and contributes maximum flowability to the fertilizer, thus helping to eliminate caking. In addition Terra-Lite is absolutely fire-proof, eliminating extra fire hazards in the plant.

Before you contract for next season's conditioner requirement, be sure you have all the facts about Terra-Lite brand vermiculite Conditioner. Send coupon below for free literature, or call, write or wire



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Shirts use up a lot of cotton. So do dresses. And sheets, towels, bags, cordage, gloves, and thread. Add to that the huge military appetite for explosives and textiles. That's why more cotton is needed this year than ever before. 16 million bales are wanted. To help reach a goal of such size—try on nitrogen! It means greater yield per plant and more harvest per acre. That goes

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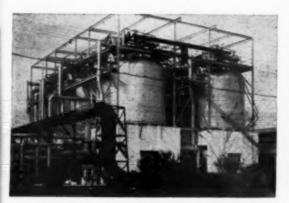
\*Interesting Facts Concerning This Basic Raw Material from the Gulf Coast Region

\*SUPERHEATED WATER ...

Mining operations are most successfully carried out if the water pumped

into the sulphur deposit is heated under pressure to a temperature of about 320° F. For large scale mining, enormous quantities of water are required, so, a primary requisite is an adequate supply of suitable water and an efficient power plant in which to heat it.

To insure a continuous supply of water at Newgulf, it is the practice to use river water pumped in time of flood or full flow and stored in large reservoirs. This supply is supplemented, when necessary, with well water. Water so obtained is seldom suitable for use in boilers or mine water heaters without being treated first because of natural salts in solution. Softening by chemical treatment is necessary to prevent deposition of scale on boiler tubes and hot water lines.



Loading operations at our Newgulf, Texas mine



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Mines: Newgulf and Moss Bluff, Texas

BAD NEWS FOR DAIRY FLIES



### GOOD NEWS FOR YOU

### PENNSALT HI-GAM W-25

(25% lindane)

is effective against:

Harn Flies • Mosquitoes • Gnats • Fleas • Ticks • Mange Mites • Lice • House Flies and certain other insect pests.

### Pennselt LINDANE Fermulations

Pennselt Hi-Gam W-25 is a wettable powder containing 25% of the gamma isomer of BHC from lindane. It can be used in water suspension spray—or as a base for formulation of less concentrated dusts. Packed in 1-lb. and 50-lb. containers.

Pennselt Hi-Gam E-20 is a liquid formulation containing 20% of the gamma isomer of BHC from lindane, it readily mixes with water to form a stable, milky emulsion which can be conveniently used in both large and small

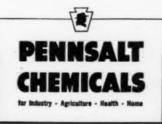
Pennsalt Hi-Gam 99—Fine, kard, technically pure lindane crystals, for formulations.

annoy herds, carry disease and cut down milk poundage. Pennsalt HI-GAM® W-25, made with lindane, is excellent for fly control in dairy barns and for lice and mange mite control on dairy cows ... as well as for control of many other livestock insect pests.

Every dairyman knows how flies and other insects

Packed with power, HI-GAM W-25 kills insects three different ways . . . by contact, by fumigation and by ingestion. It contains 25% lindane, the essentially pure gamma isomer of BHC-approved for dairy barn use by U.S.D.A.

Pennsalt HI-GAM W-25 comes to you direct from a basic chemical manufacturer, with over 100 years' experience. You get guaranteed high quality, with delivery from nearby warehouses. Pennsalt technical representatives are always at your service. Agricultural Chemicals Dept., Pennsylvania Salt Manufacturing Co., Philadelphia 7, Pa.; Tacoma, Washington; Bryan, Texas; Montgomery, Alabama; Los Angeles and Berkeley, California and Portland, Oregon.



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Full details and specifications on the better Bagpaker will be sent to you on request. Ask for brochure 260 D

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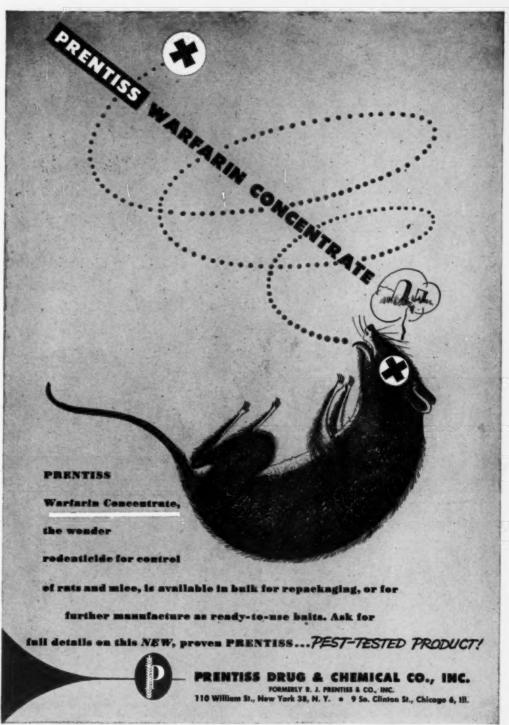
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These unique chemicals increase the effectiveness of an insecticide or herbicide. They alter
the surface—provide the emulsifying, dispersing
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The Manual pictured above has just been completed. Its aim is to help the compounder to select the Antara surfactant most compatible with the other ingredients in his compound—to insure a homogeneous, stable concentrate, with good storage and packaging properties, able to resist the effects of temperature and weather. The suggestions here offered are the result of extensive research by our laboratories, supported by long-term field testing and experience in practical use.

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Phillips 66 Ammonium Sulfate is a free-flowing 21% nitrogen material! Mixes easily! Uniform crystals resist caking! Ideal for high analysis mixed goods! A fine direct application material, too!

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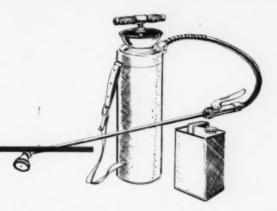
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# enemy



# of the enemy



# of crops







Mites, aphids, thrips and hosts of other enemies of farm and greenhouse crops succumb to the potency of Monsanto Nifos-T (tetraethyl pyrophosphate, technical). Nifos-T is made for the exclusive use of agriculture.

Properly formulated and correctly applied, Nifos-T destroys many insect pests. Then, its toxicity rapidly disappears. Hence, after a reasonable time, Nifos-T does not carry toxic residue to users of fruits, berries or vegetables.

Nifos-T is economical and suitable for formulation into sprays, aerosols and dusts. With proper use, Nifos-T is harmless to most plants.

Nifoe-T is one of the most toxic agricultural chemicals known; yet, with

proper precautions, it can be handled in perfect safety. An automobile, to draw a comparison, is dangerous when improperly handled. Because of the heavy demand for Nifos-T, current supplies are extremely "tight."

For further information and literature on Monsanto Nifos-T, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COM-PANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

SEND FOR LITERATURE: To help you make the most of the Nifos-T you have, Monsanto has published a folder, "Nifos-T... Monsanto's new, improved insect killer," and Technical Bulletin No. O-46, "Nifos-T... Monsanto Tetraethyl Pyraphosphate, Technical." Copies will be sent to you free upon request.

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### TO KEEP THE HOPPERS OUT OF THE CROPS



### Use CHLORDANE

The job to be done in '51 is to keep the hoppers out of the fields with early applications of chlordane. With a heavy infestation predicted this year formulators know that they must be prepared for the grasshoppers hatching period as well as the time of migration. This action calls for a well rounded supply of chlordane to keep up with the needs of successful crop growers, which will reap profits for the formulators, as well as the ultimate user.

Chlordane is a proven, top quality, controllable insecticide with a high level of performance, when used as a wettable powder, dry dust or water emulsion, offering maximum control of grasshoppers and many other insect pests that are ruinous to crops and profits.

So meet the anticipated demand for chlordane, this year, by checking your stocks and ordering early.

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DILUEX-A, produced by the Floridin Company at Quincy and Jamieson, Florida, is one of the most adaptable carriers for agricultural chemical processing. Developed with the plant operator's problems in view, it meets the most exacting requirements in liquid toxicant formulation, and is winning general acceptance throughout the industry. Availability of supplies, fully effective plant capacity, and assurance of a quality product are three advantages that the user of DILUEX-A enjoys.

Special processing makes DILUEX-A applicable to many and varied uses. Do not endure interruptions or slow-downs that a Floridin product might avoid. Correspondence is invited.





Dept. M, 120 Liberty St., Warren, Pa.



Lion Anhydrous Ammonia—Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

**Lion Aqua Ammonia**—This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lien Nitrogen Fertilizer Solutions—Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer—The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

Lion Sulphate of Ammonia—This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"



Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking.

JUNE. 1951

LION OIL COMPANY EL DORADO, ARKANSAS

### HERE'S THE ANSWER TO YOUR SPREADING PROBLEMS!

Commercial Fertilizer Attachmen Hood-Two Sizes:

19-feet or 23-feet

### AGAIN! "The NEW LEADER" leads the field

with its new "Motor-Driven Spreader" offering greater accuracy of spread with the most positive feed on the market!

SPECIAL ADVANTAGES - Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre-regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively syn-

chronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or

Spreader Body Lengths (inside measure) are 9', 11', 13' and 15'. Other body lengths on special order.

soft field conditions.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7'-5'



### "The NEW LEADER" Self-Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These prices, etc. Fast delivery service sells fertilizer!

units have four individual compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft, to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications,

FREE! Write for "The Story of a Custom Fertilizer Spreading Service"

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS



- Aldrin's reputation for superior performance in control of many destructive pests of agriculture has taken it to the far corners of the earth. Latest and most dramatic of the long hauls which have become commonplace with Aldrin was the recent answer to an SOS appeal from Iran for aid in combatting one of the worst locust plagues in its history. Thirteen tons of Aldrin were rushed via air from Denver to Tehran. Never did magic carpet, legendary mode of transportation of Iran, carry a more precious cargo. At 2 ounces of Aldrin to the acre, standard dosage for grasshopper control, the shipment will "take care" of grasshoppers on 125,000 acres. Thus, does one of the ancient lands of the Middle East join the New World in choosing Aldrin to protect its crops from destruction by insect hordes.
  - Write for further information about Aldrin and DIELDRIN for greater insect kill at lower cost.



SHELL CHEMICAL CORPORATION, New York City, are exclusive distributors of unformulated Aldrin and Dieldrin in the United States.





### THE EDITOR COMMENTS



IGNIFICANT indeed are the figures noted in the annual U.S.D.A. report on U. S. consumption of commercial fertilizers, published in this issue.

Although the over all tonnage of materials decreased about one percent from the 18,541,885 ton figure reported last year, the total plant nutrient content *increased* about three percent. (From 3,934,728 to 4,061,529 tons)

This shows a definite trend toward more concentrated mixtures, a goal long sought by many in both the fertilizer industry and the consumer ranks. The ultimate in high analysis products is of course far away still, but it is encouraging to note it moving closer. It is always better to have such advancement come naturally and gradually, than to attempt forcing such ideas into the farmer's program.

Statisticians in the U.S.D.A. have done an enormous amount of work in compiling these figures from all parts of the U.S. and its possessions. It is a report on which many persons in the industry depend to see which way the wind is blowing. We think most of our readers will like what they read in the 1949-50 report in this issue.



MPROVEMENT of the industrial safety record of the fertilizer industry is a goal well worth the seeking by the industry. That steps are being taken

toward this end, is a significant and noteworthy fact. A recent meeting of the advisory committee of the newly-formed fertilizer section of the National Safety Congress put into motion what we hope will grow into an organized national effort to reduce both the frequency and severity of accident injuries.

Chairman of the advisory committee is A. B. Pettit, supervisor of industrial health and safety of the Davison Chemical Corp., Baltimore, a firm which last year won two safety awards from the National Safety Council, including the Distinguished Service to Safety Award.

Mr. Pettit points out that many other industries have for years cooperated to conduct special sessions for solution of specific problems at the National Safety Congress which this year meets in Chicago on October 11, in connection with the all week session. Results have been gratifying, with substantial reduction in the number and seriousness of accidents and a decrease in industrial illness.

The fertilizer industry is urged to send representatives to the October meeting where measures for reducing accidents and illness will be discussed, along with exchanges of health and accident information, the keeping of adequate records and analysis of accident causes. Both the National Fertilizer Association and the American Plant Food Council are supporting the work of the Committee.



HE recent meeting of the National Agricultural Chemicals Association's Information Committee on the campus of Rutgers University was

a real success, according to all reports we have had. Seeing at first hand the work being done by an outstanding agricultural experiment station and meeting the men in charge of these projects can't help but cement good relations even more solidly.

For the past ten years or so, the role of the experiment station and the land grant college has been one of increasing importance to the industry, and cooperation has increased steadily as more and more materials were tested and appraised. Now that the industry is faced with greater problems than ever before regarding the use, application and toxicity of agricultural chemicals, it seems most appropriate that the NACA Information Committee should take this step toward getting better acquainted with the "behind the scenes" scientists who do much of the screening and preliminary work on pesticides.

We hope that this idea of meeting on the campuses of land grant colleges will be continued so that the problems of agricultural pest control in various parts of the country may be seen at first hand and in detail by this important group of industry representatives.



### Need for Continued Research for Pesticides

by Avery S. Hoyt

Chief, Bureau of Entomology and Plant Quarantine. U. S. Department of Agriculture. Washington 25. D. C.

T is doubtful if there is an accurate estimate of the additional quantity of food, feed, and fibre crops which are made available annually to our economy through the control of destructive insects. Some entomologists think 10 percent is a conservative figure. It has been estimated that insect and plant disease control increase potato production more than 30 percent. Insect control doubles yields of alfalfa seed. Wireworm control in some areas has been reflected in increased production of more than 40 bushels of corn per acre. Fresh fruits, vegetables, and nuts are available almost throughout the year in most markets. Sweet corn, tomatoes, lima beans, string beans, and many other valuable sources of vitamins are now on the market months before and after the time they used to appear.

Use of insecticides has been an important factor in this change. Corn earworm once prevented profitable growing of sweet corn early in the season in the south and late in the season in the north. Today, thousands of acres of sweet corn prove that these conditions

have been overcome. There are many such examples.

The agricultural chemical industry during the last ten years has made enormous progress in the manufacture and formulation of insecticides. The use of these materials has broadened and extended. This development reflects in large measure the cooperation between industry and state and federal agencies. It is the responsibility of the B. E. P. Q. to develop methods to control injurious insects and to recommend those methods for public use. Of course the Bureau welcomes the participation of the industry in this activity. It recognizes the research carried on by industry. It sees the need for further efforts. It appreciates the help and it looks forward to continued mutually helpful endeavors.

A recent instance of the Bureau's intention to continue and extend its activities in the field of insecticides is the creation of a new position—Assistant Chief in Charge of Insecticides-Chemistry. A well-known insecticide chemist, Dr. H. L. Haller, has been appointed to that position. There is urgent need

(Turn to Page 105)

# Commercial Pertilizers

CONSUMPTION in the UNITED STATES 1949-50

### by Walter Scholl & H. M. Wallace

Division of Fertilizer and Agricultural Lime
Bureau of Plant Industry, Soils and Agricultural Engineering
Agricultural Research Administration
U. S. Department of Agriculture

Beltsville, Maryland

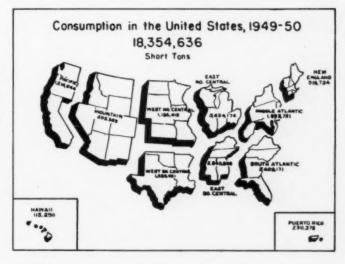
HIPMENTS of all commercial fertilizers, mixtures and separate materials, during the year ended June 30, 1950, for consumption in the United States and its Territories decreased 187,249 tons, or about one percent from the 18,541,885 tons shipped during the year ended June 30, 1949.

A total of 18,354,636 tons was shipped during the year ended June 30, 1950. The total plant-nutrient content (N, available P<sub>2</sub>O<sub>3</sub>, and K<sub>2</sub>O), however, increased 126, 801 tons or about three percent from 3,934,728 tons in 1948-49 to 4,061, 529 tons in 1949-50. The weighted average nutrient content of the com-

mercial mixtures used also increased about three percent from 22.55 in 1948-49 to 23.24 percent in 1949-50.

The data herewith show the number of tons of fertilizer reported shipped by manufacturers throughout the forty-eight states and the territories. The amount of nutrients supplied by commercial fertilizers was

Graphically portrayed in the map at right is a break-down of how the 18,354,636 tons of fertilizer were distributed. The south Atlantic states still use more plant food than any other section.



computed from the tonnages determined in this survey on the basis of analyses reported in state official publications. The weighted average nutrient content of commercial mixtures was determined from the grades and tonnages reported for each state and the average overrun or underrun. Fertilizer manufacturers, state fertilizer control officials and agronomists cooperated freely in providing information for this 11th annual survey.

### **Total Consumption**

TN 28 States and the Territories Lconsumption was larger than in 1948-49, as indicated in Table 1. Included were most of the states located in the Middle Atlantic, West

South Central, Mountain and Pacific regions. Total increase in shipments in these states and Territories amounted to 541,077 tons. In contrast, however, shipments in the remaining states decreased 728,326 tons. The average shipments in 22 states increased in 1948-49, 11 percent above those in 1947-48, but in 1949-50 averaged 5 percent less than in 1948-49. In 14 other states 1948-49 distribution averaged 20 percent less than in 1947-48, but in 1949-50 averaged 11 percent more than in 1948-49. In 12 states shipments have shown a continued increase, with an average of 6 percent in 1948-49 and 13 percent in 1949-50,

In only a few states, New Jersey, South Carolina, Minnesota, and the Dakotas, were shipments less than 90 percent of their 1948-49 deliveries. The distribution of the total shipments was 43 percent in the Atlantic Coast states, 47 percent in the Central states, 8 percent in the Mountain and Pacific states and 2 percent in the Territories. Shipments in the January-June, 1950, period amounted to 13,445,056 tons or 73.2 percent of the total, as compared with 70.2 percent for the corresponding period of 1949.

Mixtures

OMMERCIAL mixtures amount to 12,308,932 tons and represent 67.0 percent of the total deliveries of all fertilizers in 1949-50, as compared with 12,839,506 tons of 69.2 percent for 1948-49. Shipments of mixtures were, therefore, 530,574 tons less than in 1948-49. Distribution was less in all regions except the West South Central region and the Territories. More than half of the decrease was in the East North Central and the East South Central regions.

The total number of grades sold in Continental United States was 927. Included were 468 grades with sales less than 100 tons each. In addition there were possibly 100 or more not listed by grade. The tonnages of all grades distributed in Continental United States in excess

TABLE I Consumption of Commercial Fertilizer Mixtures and Separate Materials, Year Ended June 30, 19501

State & Region.		moretal Pist			marate Mater	tale - 1988-50	Pertiliners	Coupomption Coupomption 1169-01 - 100		
	duly 1 = Dec. 15, 1100	June 10, 1000	1968-00 Year 796a1	July 1 * 190: 35, 1902	June 1 - June 30, 1980	Tues Synal	Grand Dried	Ail Fartiliosra	Total Fing	
	Tree.	Trea	Tons	Tona	Tree	Time	11004	Percent	Percent	
nine	28,097	278,151	204,228	7,016	15,811	20,626	226,765		-	
me describing	1,014	12,084	10,118	2,685	0,213	11,000	28,015	109	317	
princis.	0,940	19,071	50,713	19,386	13,990	30,145	60,806	96	199	
nesects set to	1,016	61,786	68,380	8,876	16,196	20,860	88,892	87	36	
hode Island unsertSoul	1,277	15,100 00,527	19,391	7,063	8,000	3,003	17,992	100	107	
new logical	51,401	357,409	990 <sub>4</sub> 018	61,632	84,000	186,732	535,734		101	
ma York	70,004	347,890	480,414	60,976	100,791	107,715	609,065	100	200	
on Jacony	37,169	175,060	234,100	6,904	10,789	83,900	887,780	86	98	
mayi Walik	310,100	100,296	663,209	33,186	79,500	130,996	070,060	209	206	
clamer agrees of Columbia	24,010	30,482	1,800	100	2,446	5,273	57,507	202	104	
aryland	70,607	148,710	222,386	3,000	31,165	82,380	883,767	200	200	
mot lingings	11,292	10,300	320,400	0,003	20,400	96,000	100,100	306	100	
Widdle Atlantic	264,000	1,129,013	1,405,805	100,210	201,000	200,025	1,803,721	\$08	208	
irginia	139,790	685,200	194,070	23,540	315,588	199,020	728,394	100	109	
orth Carolina	\$30,002	1,100,000	1,203,680	79,035	270,165	545,090	1,740,246	10	98	
meth Terofuse	83,989	630,081	. 613,008	\$5,110	115,300	262,001	978,008	86	80	
ergis lorida	286,800	905,000 608,000	714,800	30,000	194,220	993,175 83,306	1,100,000	338	141	
				277,700	661,560			100	19	
South Atlantic	121,141	5,452,170	4,280,126		-	1,129,000	5,405,171	97	200	
tide miliens	107,146	136,210	703,410	21,700	41,099	43,776 95,028	719,457	82	100	
Minche	82,244	239,179	202,110	315,144	300,873	990,437	970,000	-	99	
Sen Lypen	120,004	283,288	408,757	14,542	03,088	60,808	475,485	256	309	
ieccasio	46,230	180,920	355,198	16,016	12,970	40,503	1 184,752	- 96	100	
Sant Seeds restroit	761,060	1,873,400	2,412,740	407,529	461,300	913,474	2,409,174	99	861	
Loosaria	19,516	324,342	143,040	12,504	51,000	74,310	217,996	87	14	
-	19,427	100,600	188,029	29,260	100 <sub>0</sub> 881	148,600	958,463 407,730	100	20	
seasors orth Dakota	92,000 F,411	170,102	18,811	1,892	90,651	6,540	19,071	47	18	
Into Depote	460	0,045	8,407	109	1,440	1,000	3,496	9.0	67	
6078328	1,716	7,613	9,365	0,086	88,687	20,007	63,637	119	199	
BOURK	26,461	20,411	44,812	65,110	47,212	112,500	190,315	141	168	
Meat Forth Control	161,669	104,115	600,224	178,415	361,577	584,185	1,189,415	100	106	
antucky postane	69,911	200,004	104,903	80,000	100,409	385,780	154,090	205	208	
Johann	98,403	067,140	709,410	110,416	227,100	379,004	1,150,770	98	97	
Lasinatopi	21,806	258,014	276,980	160,369	210,379	262,767	560,607	03.	99	
Sect. Study, Destroit.	121,463	1,50,005	3,724,084	401 <sub>2</sub> 104	710,710	1,110,774	2,000,000	¥2	802	
PARTER	0,389	184,470	190,910	43,786	124,000	187,901	510,640	203	109	
01101000	22,003	130,880	100,001	10,781	00,380	101,100	376,090	100 0	116	
Alabom .	11,499	40,797	11,296	40,728	19,008	91,980	141,066	154	290	
9000	42,656	210,150	202,014	174,340	128,579	500,121	505 <sub>8</sub> 635	126	126	
Meet Sorth (cotra)	04,987	130,713	615,540	100,025	172,048	874,603	1,200,003	150	180	
noteon	100	8,018	5,548	2,018	0,548	8,600	10,667	118	188	
OMPO	210	7,815	7,900	11,740	3,005	44,190	01,960	309 338	180	
pusing olorado	2,961	1,418	17,094	7,040	14,000	8,390	19,141	118	319	
ne Busino	89	680	681	7,083	11,473	19,080	19,863	138	319	
25 com	4,800	18,649	17,411	17,822	18,940	98,000	61,876	90	117	
hab wasta	204	1,000	8,899	1,441	9,600	19,941	15,787	155	125	
Prontels:	9,341	-	47,356	80,616	109,496	150,014	205,360	120	127	
Boht ighno	6,000	81 <sub>4</sub> 014	20,004	17,610	10,003	04,470	01,060	800	110	
Pages	4,190	20,007	84,719	34,908	47,016	73,190	99,991	197	330	
allFormia .	88,127	90,900	104,038	\$10,000	950,667	872,260	1,050,301	97	107	
Fertifie	76,580	141,508	838,800	460,253	640,525	618,683	1,174,146	14	110	
estimental N. S.	2,530,950	0,000,414	12,047,179	1,200,285	3,735,504	0,041,080	17,005,000	6.0	100	
B#015	15,500	18,283	20,010	62,307	28,100	70,870	110,000	209	310	
Lerte Stee	14,019	127,076	321,435	9,000	10,105	29,763	200,379	197	189	
Parritories /	109,199	151,050	841,000	61,700	62,560	100,110	205,000	107	110	
1000-60 1000-60	2,550,560	3,600,572 3,602,76L	12,500,518	8,381,03U 8,387,273	5,700,000	8,005,704)/ 6,702,5790/	10,104,6005	89	305	

Table 2

Consumption of Mixed Fertilizers in the Continental United States, Year Ended June 30, 1950, by Principal Grades, with Comparison for Year Ended June 30, 1949

Grade	Year Ende	mption d June 30,	Year Ende		Grade	Year Ende	ed June 30,	Proportion of Total Year Ended June 30,		
	1950	1949	1950	1949		1950	1949	1950	1949	
0-0-8	Tone 19,539	Tone 9,568	Percent 0.16	Percent .08	5-7-10	70ms 11,541	Tone 19,625	Percent .09	Percent .16	
0-9-27	35,061	32,367	.29	.26	5-8-7	31,031	36,741	.26	.29	
0-10-20	18,956	30,261	.16	.24	5-10-5	872,377	993,446	7.24	7.89	
0-12-12	130,485	251,048	1.00	1.99	5-10-10	446,741	457,646	3.71	3.64	
0-14-7	132,808	148,092	1.10	1.18	5-20-10	17,823	11,188	.16	.09	
0-14-10	119,836	83,378	.99	.42	6-3-6	25,273	23,814	.21	.19	
0-14-14	130,066	34,958	1.08	.28	6-6-6	27,105	16,490	.22	.15	
0-15-15	13,172	12,248	-11	.10	6-6-8	13,763	9,803	-11	.08	
0-20-10	85,799	94,776	.71	.75	6-6-9	16,286	4,884	.14	.04	
0-20-30	116,880	67,935	.97	.54	6-8-4	287,406	416,528	2.38	3.31	
2-12-6	879,784	1,316,872	7.30	10.45	8-8-6	287,063	276,710	2.58	2.20	
2-12-12	198,765	159,128	1.65	1.26	6-8-8	148,758	116,711	1.40	.93	
2-14-8	16,240	18,445	.13	.15	6-8-12	38,154	39,545	.52	.51	
2-16-8	34,510	35,186	.29	.28	6-9-9	10,698	10,328	.09	.08	
3-8-6	24,546	29,133	.20	.23	6-9-12	59,412	71,473	-49	.57	
3-8-8	25,469	32,041	.21	.25	6-10-4	53,004	38,076	.44	.30	
3-9-6	781,651	826,944	6.49	6.57	6-12-6	25,982	25,436	.22	.20	
3-9-9	275,011	221,514	2.28	76	6-12-12	30,806	3,469	.26	.03	
3-9-12	29,132	30,973	-24	.25	6-18-6	11,860	12,872	.10	.10	
3-9-18	128,934	119,865	1.07	.95	7-7-7	50,892	53,765	.42	.43	
3-12-6	803,326	859,699	6.67	6.83	8-0-8	12,928	10,570	.11	-08	
3-12-12	1,221,726	971,954	10.14	7.72	8-8-4	19,646	21,651	.16	.17	
3-18-9	154,636	145,012	1.28	1.16	8-8-8	89,392	78,111	.74	.58	
4-6-6	12,210	7,639	.10	.06	8-10-12	10,085	10,876	.08	-09	
4-6-8	82,103	76,714	.69	.61	8-12-16	29,484	25,559	.24	*50	
4-7-5	118,368	111,134	.96	.88	8-16-16	38,432	37,117	.33	.29	
4-8-4	16,016	15,231	.13	.12	8-24-6	12,860	556	.11	.00	
4-8-8	559,931	612,662	4.65	4.87	8-52-0	11,517	120	.10	.00	
4-8-8	221,469	217,638	1.86	1.73	10-0-10	15,400	21,673	.13	.17	
4-8-12	72,036	72,936	.60	. 58	10-6-4	26,324	29,028	.22	.25	
4-9-5	81,701	73,408	.68	. 58	10-10-0	18,641	23,711	.16	.19	
4-10-4	37,176	62,582	.31	.42	10-10-6	38,067	46,917	.52	.37	
4-10-6	622,372	809,806	6.17	6.43	10-10-10	32,071	15,058	.27	-12	
4-10-7	386,671	418,689	3.21	3.33	10-16-8	10,194	7,554	.08	.06	
4-12-4	432,923	554,954	3.59	4.41	10-20-0	33,714	18,579	.28	.15	
4-12-6	15,054	5,597	.12	.04	14-0-14	11,446	9,699	-10	.08	
4-12-8	276,994	263,639	2.30	2.09	17-7-0	21,483	32,717	.18	.26	
1-12-12	20,514	15,835	.17	.13		11 400 041	10 000 000	95.40	95,87	
4-16-0	63,999	94,686	-45	.75	81 mixtures	11,492,861	12,069,373	90.40	90.07	
4-16-8	45,617	41,265	.38	.33	Other specified gradeal	359,420	367,011	2.98	2.92	
4-16-16	44,080	26,885	.36	.21	Owner specified gradean	309,420	307,011	2.00	4.95	
4-24-12	62,263	36,909 15,524	.62	.30	Wiscellaneous2/	195,088	162,081	1.62	1.21	
5-5-20 5-7-6	19,889	22,106	.16	.18	Total	12,047,369	12,588,485	100.00	100.00	

There were 846 in 1949-60 and 815 in the 1948-49 season.

Table 3 .

Consumption of 15 Principal Mixtures in Each Region of the United States
Year Ended June 30, 1950

								New Sugle	ind									
Ohako	So. of Sisteraly	8-10-10	9-9-12	0-14-14	(148+7	8-38-36	8-3-6	0-20-80	8-16-16	1-7-7	5-7-30	0-0-0	0-10-0	0-10-12	4-12-4	8-9-10	All Other Mirrores	Sales!
Noise hee Emmpshire townent Messackweeths Once Teland Concections	60 36 36 37 37 38 32	80,086 4,732 6,708 27,833 6,090 9,790	69,719 0 0 0	25,070 680 3,760 1,987 091 1,330	5, w97 1,481 019 11,282 1,736 2,482	20,851 332 0 66 0	0 12 0,000 0 15,734	117 4,618 9,858 3,862 86 5,183	10,878 1,817 3,781 3,469 869	740 1,085 949 6,007 943 5,372	11,041	10,688 0 0 0 0	865 200 815 4,487 836 1,223	6,758 831 63 179 73 801	008 881 880 2,174 012 2,779	8,403	20,883 3,948 3,948 9,900 2,902 9,870	204,235 34,335 30,711 49,363 14,363 86,283
Total	85	74,204	60,772	32,102	51,024	20,420	25,275	20,952	10,542	14,086	11,341	10,400	7,623	7,100	6,729	3,403	37,518	180,018
							K	iddle Atla	ette									
		8-48-6	6-10-20	8-10-5	4-12-0	6-6-10	4=12=6	0-14-7	0-11-d	3-0-12	0-18-12	0-80-80	4-11-B	10-10-10	7-7-7	8-8-8		
New York New Jarany Pennsylvanda Columnare District of Occamble Hery Virginia Rest Virginia	61, 83 66 61, 10 72 81,	43,100 13,168 280,000 18,763 134 107,000 17,010	96,521 98,027 90,700 0,161 2 9,061 0,048	158,616 28,34s 26,103 3,8ss 046 27,170 3,408	5,163 23,180 22,101 5,186 4 11,100 6,730	26,623 875 12,675 8,981 163 26,686 8	15,316 965 25,104 080 47 2,425 10,942	1,041 1,366 13,971 8,780 6 7,784 9,060	23,266 87 8,003 0 0	1,608 13,605 827 8,948 0 6,007	974 2,807 5,690 0,835 0 8,871	6,269 3,653 6,477 660 0 371 3,749	16,177 0 0 70 108	8,241 1,947 4,491 180 8 101 200	5,179 6,669 1,065 80 8 2,770 45	166 93 187 1,019 16 11,017 61	43,003 19,100 30,530 7,601 610 17,040 2,420	620,614 234,120 921,800 64,274 1,335 282,266
Yotal	117	585,080	275,145	230,023	93,123	89,054	80,181	34,952	25,944	25,454	17,006	16,107	18,303	15,002	16,042	12,007	129,007	1,495,993
								South Atlan	otto									
		9=10=6	3-9-6	4-0-0	3-13-6	5-3-9	0=10=6	8-12-18	6-0-6	4-0-9	6=7=6	0-14-14	6-6-8	4-0-3	4-12-4	6-30-10		
Virginia North Chrolina South Carolina Georgia Florida	47 18 10 87 000	15,200 387,008 240,523 10,486 636	41,004 600,341 72,002 08,000 76	0 0 834 803,376 60,200	\$70 <sub>9</sub> 700 90 <sub>9</sub> 501 80 <sub>9</sub> 94x 4 <sub>9</sub> 140 27	4,005 77,013 383,308 66,680 1,216	87,048 52,006 61,000 16,548 5,082	93,081 93,084 0 7,400 323	80,324 70,508 8,835 80,250 6,998	29 0 32,070 84,700 67,073	0 0 0 0 119,192	28,230 27,273 086 081 14	0 0 0 0 81,900	4,235 47,485 0 4,715 25,317	86,705 15,362 3,008 2,803 3,704	4,499 36,863 4,511 8 2,765	84,000 78,078 30,000 130,000 411,178	084,079 1,585,610 615,086 804,861 764,680
Total	836	880,589	611,122	550,890	297,272	214,696	192,626	102,960	164,782	152,002	110,300	04,532	81,908	01,001	06,637	50,108	730,761	4,280,186
							Bac	s north De	etral							1		
		3-12-12	2-12-6	3-19-9	4-12-6	0-10-18	3-0-10	0=20=10	9+69+60	2-12-8	9-10-10	2-2-2	0-9-29	4-15-18	4-16-8	0-14-9	-	
Ohio Indiana Illimia Sichigan Sicocasin	48 88 81 27 18	274,546 349,490 190,460 114,199 163,401	314,658 145,681 21,089 129,697 20,600	\$7,866 \$7,891 \$,100 \$0,890 \$0,272	34,367 25,666 23,231 14,760 15,626	19,051 29,078 0,002 12,117 10,545	5,077 10,002 20,000 7,702 10,912	2,250 1,680 4,681 4,391 64,020	7,608 32,561 3,877 10,078 19,487	0 3 0 54,412 0	38,652 1,400 0 40 0	4,507 10,146 11,480 1,400 6,001	368 6,400 4,308 2,261 18,504	#30 #,817 0,071 #,150 6,282	8,772 867 68 3,422 6,761	0,067 2,668 883 2,171 1,210	77,240 27,420 29,000 27,006 19,611	843,866 703,456 882,110 600,707 885,156
Total	209	1,083,902	635,303	141,012	115,812	80,369	73,224	57,340	54,187	34,415	34,100	33,298	25,634	24,790	10,894	15,013	109,073	E_81E_700

<sup>2/</sup> Grade not reported.

								Rant	Suren neet	ral								
State	No. of Bistures!	4-12-6	1-18-12	7-12-6	4-24-12	4-10-0	0×80×10	0-80-80	Sectorit.	10-20-0	4-11-9	3-0-19	4-18-18	2-18-5	0-0-0	8-89-0	All Other Wistures	total
Minomote Ioma Nissonri North Descta Jamin Descta Datrada Ranges	68 71 60 66 24 39	4,004 97,003 40 00 119 30,000	24,500 60,794 39,652 1,106 39 37 300	260 12,306 89,143 340 7 8 8,723	25,729 707 18,463 2,064 60 7	134 53,513 5,600 68 1,309 2,500 4,578	28,346 2,088 3,084 388 18 0	13,670 1,680 6,970 108 7 2	8,048 38,276 1 137 17 0 39	001 7,000 1,010 00 254 1,000 0,214	27,300 2,540 27 19 49 00	834 2,400 36,821 0 0	18,763 8,890 4 919 3 0	4,871 5,070 733 781 110 38	56 1,047 8,487 145 8 7	580 6,030 0 342 3 769 3,018	27,562 24,607 30,176 3,008 994 4,185 1,200	145,000 100,029 200,230 18,001 2,007 0,346 49,002
Tutal	187	100,000	101,788	10,000	65,000	61,392	27,092	22,680	21,471	20,156	20,086	19,000	10,200	10,041	12,006	11,530	101,619	885,224
								lines	Posts (4st	rei								
		9-20-7	0-0-4	2-9-0	0-10-6	u=0=0	Z=12=0	6-0-6	0+16+10	4-10-4	0-0-0	\$=1,0=0	0=10=6	0-18-18	0-14-7	0-12-12		
Seabooky Tennesses Alatems Sidessessos	93 60 87	0 34 340,740 10,000	18,280 219,298 40,107	01,547 110,688 3	8,010 9,000 1,580 141,689	07 7,000 41,080 78,410	93,005 26,063 4	99,597 0,405 00 10	0 97 86,800 2,868	14,080 49,490 21 20	97,047 55 50	85,965 3,666 0 0	54,002	2,256	0,756 7,476 0 308	0,091 9,091 83	24,212 10,207 17,143 3,882	246,802 240,885 799,659 276,840
Total	- 00	209,942	201,010	170,370	186,770	125,007	110,612	117,100	80,537	62,597	82,100	40,075	24,600	28,536	16,494	13,030	80,536	1,724,034
								What	South Sant	ral								
		5-50-6	4-12-6	4-9-12	1-0-10	0=0=0	0-14-7	0-10-4	6-8-6	4=0=0	4-12-0	1-12-12	e-10-0	10-33-40	12-18-12	10-10-0		
Arthogae Loctaiona Onjahoma Tuesa	27 30 30 18	68,308 96,700 20,633 130,222	10,466 20,420 22,608 30,274	84,085 2,100 19 514	83,100 61 493	5,000 23,144 298 6,000	687 5,046 1,009 20,630	\$04 4,010 908 7,405	1,300 31,158 99	2,163 1,085 8 6,694	0,014	117 7,798 19 830	1,040	362 884 173 3,070	2,526 1,041 100	346 346 303 2,876	977 2,770 2,890 7,674	100,419 161,421 89,286 862,614
71592	100	817,136	130,000	14,770	34,005	15,488	31,365	14,756	12,162	10,566	8,811	8,154	8,040	4,354	3,633	2,109	13,010	615,540
	1	1		Account to the				0111111	Emstale									
-		10=20=0	10-10-0	10-16-0	18-84-0	10-10-10	6-30-0	10-30-0	0-24-6	7-81-7	10-10-0	10-12-0	10-20-10	10-20-6	6-10-4	6-200-5		
Finitions Idate System System Colorade Colorade Sale Sale Sale Sale Sale Sale Sale Sal	26 20 28 20 20 20 20 21 7	2,065 1,204 243 1,409 61 1,060 348 319	2,040 69 104 20 7,139 88 0	2,725 0 13	0 873 3,600	1,007 0 728	219 089 11 097 0 0 308 0	20 000 3 240 1 277 80 29	1,463	1,386	100 100 100 15 0 0 0 0 0	973	0 0 18 0 6 774 0 0	0 0 0 0 786	0 182 0 0 177 88 900 382	298 298 292 0	1,000 1,000 569 2,000 47 2,100 1,000 7.002	2,149 7,000 3,430 37,899 609 17,431 4,049 329 49,355
10482	-	0,748	0,010	4,40			4,100	A	notifie.	1,040	1,100					-	-	
		10-10-6	17-7-0	20.5	6-10-6	5-27-30	W-101-12	5-8-6	15-8-4	10-16-0	5-10-10	S=6-6	10=20=0	4-15-10	10-12-10	10-10-0		
General on Cresson Cressformie	60 48 61	1,708 933 35,706	188 10 51,100	0 80 10,160	4,770 1,098 10,212	7,778 3,863 0	0,005	0 0 0 0,008	0 0 0,521	384 5,395 388	1,682	1,451	37 830 2,500	2,544	8,675	35 274 2 <sub>4</sub> 099	9,005 9,049 43,346	38,904 66,719 104,081
Total	116	16,195	83,714	19,700	16,624	11,135	5,000	8,065	6,404	6,837	5,481	2,076	2,486	2,194	2,575	2,878	63,829	215,666
									(tories)									
-		10-0-10	18-6-10	18-0-0	7-8-10	10-1-12	10-10-5	10-6-16	12-4-6	6-0-10	12-5-14	3,419	3,000	12-6-10	2,050	1,488		
Poerta Illon	43	63,100	55,283	208,55	82,519	\$1,500	7,400	7,276	6,085	4,201	5,012	2,419	2,000	0,000	E4880	1,465	7,378	221,088

by The masser of nictures shown for each State and region is exclusive of operand or electrisaneous mixtures ont especified by grade, although their techniques are included in the totals

of ten thousand tons each are in Table 2, together with the tonnage distributed in 1948-49. The total tonnage of these 81 grades amounted to 11,492,871 tons and represented more than 95 percent of the total tonnage of all mixtures in 1949-50.

Grade 3-12-12 replaced the 2-12-6 as the one selling in largest tonnage in the United States. Distribution of grade 3-12-12 amounted to 1,221,725 tons or 10.14 percent of the total tonnage of all mixtures. Grades 2-12-6, 5-10-5, 3-12-6, and 3-9-6, in this order, were the grades selling in the next largest tonnage. The total tonnage of these five grades was 4,558,862 tons or 37.84 percent of the total for all mixtures in 1949-50.

The 15 grades sold in greatest tonnage in each region are shown in Table 3. In all but 8 states these 15 grades represent 80 percent (in most states 90 percent) or more of the total shipments, but in Florida, they represent only 48, Utah 51, Nebraska 55, and Wyoming 59 percent. These 15

grades include the 10 principal grades that were used during 1948-49 with the following exceptions. Only 3,374 tons of the 6-9-15 were shipped in Maine compared with 10,091 tons in 1948-49. In the East North Central region the 2-12-12 dorpped from 44,775 tons to 2,901 tons, the 12-15-0 from 2,267 tons to 229 tons in the Mountain region and the 4-12-4 from 5,109 tons to 2,301 tons in the Pacific region. Although the principal grades have remained practically the same as for 1948-49, the order of their importance is somewhat different. The first two grades in each of the regions, however, were the same grades as in 1948-49.

The weighted average nutrient content of commercial mixtures ranged from 18.72 percent in Georgia to 36.25 percent in North Dakota, as shown in Table 4. The averages were higher in practically all States than for 1948-49. The United States average for nitrogen was 4.02 percent, available P<sub>2</sub>O<sub>8</sub> 10.93 percent,

and K<sub>2</sub>O 8.29 percent. The average for nitrogen was higher by 0.03 percent than for 1948-49 and lower by 0.02 percent than for 1947-48. Available P<sub>2</sub>O<sub>5</sub> increased by 0.15 percent and 0.07 percent whereas K<sub>2</sub>O increased by 0.51 percent and 0.63 percent in comparison with 1948-49 and 1947-48, respectively. The most significant change in composition of commercial mixtures over previous years was a higher content of potash.

### Separate Materials

SHIPMENTS in each State of separate materials for direct use on the land or for farm mixing, shown in Table 5, amounted to 6,045,704 tons in 1949-50. Shipments were less in North Carolina, South Carolina, Illinois, Minnesota, and 12 other States. Notably increased usage, however, was indicated by larger shipments in all the other States, but principally in the States in the South Central Regions, in the Mountain Region, excepting Arizona, and in

the Territories. Total shipments of separate materials increased 343,325 tons or 6.0 percent more than in 1948-49.

Shipments of ammonium nitrate increased from 347,223 tons to 577, 562 tons. Increases were very noticeable in all States but 7. Most of these were in the North Central Region. Distribution of sodium nitrate decreased in all States but 10. The use of anhydrous ammonia amounted to 85,516 tons as compared with 65,596 tons in 1948-49.

Although there was a general increase in shipments of organics, shipments in all the Southeastern States were less than for the previous year. Shipments in these States amounted to 17,949 tons compared with 21,077 tons for 1948-49.

The total distribution of phosphate rock was only a little more than in 1948-49. Shipments in Illinois decreased from 509,371 tons to 452,608 tons, whereas distribution in Missouri increased from 44,192 tons to 75,372 tons, in Kansas from 8,522 tons to 25,961 tons, and in Oklahoma from 19,153 tons to 30,162 tons. The use of normal superphosphate decreased in nearly all States of the West North Central and Mountain regions, but the increased distribution of concentrated superphosphate in these States more than made-up for the decrease of normal superphosphate. Total distribution of miscellaneous phosphate decreased in the South Atlantic and West South Central Region but increased in the Middle Atlantic and in the East South Central Region. Total distribution, therefore, was about the same as for 1948-49.

The total consumption of potash salts was only a little less in 1949-50 than in 1948-49. Muriate of potash was more widely used than the manure salts. The total distribution of muriate of potash increased from 95,108 tons to 109,289 tons, which was nearly double the amount distributed in 1947-48. Distribution increased in all of the Regions and in the Territories except Regions along the Atlantic Coast. The total distribution of miscellaneous potash

Table 4
Weighted Average Plant-Nutrient Content of
Commercial Mixtures Consumed in the United States.
Year Ended June 30, 1950 and 1949

State & Region  Maine New Hampshire Vermont Massachusetts Rhode Island Connecticut New York New Jersey Pennsylvania Delaware District of Columbia Maryland West Virginia Middle Atlantic Virginia Florida South Atlantic	#itrogem  Percent 5.71 3.88 3.17 6.31 5.01 6.34 5.28 4.93 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.65 3.78 3.91 4.51	Available Phosphoris Cxide Fercent 11.02 13.67 15.24 9.91 10.24 8.85 10.92 11.36 10.66 12.36 11.61 9.51 11.61 9.51 11.69 10.86 9.87 9.88	12.78 13.26 15.06 9.19 10.88 8.79 11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43	Total  Percent  29.61 30.71 33.47 24.41 26.13 22.96 27.91  24.27 24.67 23.90 23.69 24.94 22.89, 23.44	June 30, 1946 Totel Percent 28,70 27,15 29,72 25,20 24,66 21,98 27,02 23,74 24,72 23,74 23,01 21,70 22,74 22,56 23,66
New Hampshire Vermont Massachmeetts Rhods Island Connecticut New England New York New Jersey Pennsylvania Delaware District of Columbia Maryland West Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	6.71 3.88 3.17 6.31 5.01 6.34 5.28 4.93 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	Fercent  11.02 13.57 15.24 9.91 10.24 8.95 10.92 11.36 10.66 12.38 11.51 9.51 11.51 12.77 11.69	12.78 13.26 15.06 9.19 10.88 8.79 11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43	29.61 30.71 33.47 24.41 26.13 22.96 27.91 24.27 23.69 23.69 24.94 22.89, 23.44 23.96	28.70 27.15 29.72 25.20 24.66 21.96 27.02 23.71 24.72 23.74 23.74 23.70 21.70 22.74 22.56
New Hampshire Vermont Massachmeetts Rhods Island Connecticut New England New York New Jersey Pennsylvania Delaware District of Columbia Nexyland West Virginia Middle Atlantic Virginia South Carolina Georgia Florida South Atlantic	6.71 3.88 3.17 6.31 5.01 6.34 5.28 4.93 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	11.02 13.57 15.24 9.91 10.24 8.85 10.92 11.36 10.66 12.36 11.51 9.51 11.51 12.77 11.69	12.78 13.26 15.06 9.19 10.88 8.79 11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43	29.61 30.71 33.47 24.41 26.13 22.96 27.91 24.27 23.69 23.69 24.94 22.89, 23.44 23.96	28.70 27.15 29.72 25.20 24.66 21.98 27.02 23.71 24.72 23.74 23.01 21.70 22.74 22.56
New Hampshire Vermont Massachmeetts Rhods Island Commesticut New England New York New Jersey Pennsylvania Delaware District of Columbia Mest Virginia Middle Atlantic Virginia North Carolina Georgia Florida South Atlantic	3.88 3.17 6.31 5.01 6.34 5.28 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	13.57 15.24 9.91 10.24 8.83 10.92 11.36 10.66 12.36 11.51 9.51 11.51 12.77 11.69	13.26 15.06 9.19 10.66 8.79 11.71 7.96 9.40 7.84 8.75 9.44 7.80 7.43	30.71 33.47 24.41 26.13 22.96 27.91 24.27 24.67 23.90 23.69 24.94 22.89, 23.44	27.16 29.72 25.20 24.66 21.98 27.02 23.71 24.72 23.74 23.01 21.70 22.74 22.56
Vermont Massachusetts Rhode Island Connecticut New England New York New Jersey Pennsylvania Delaware District of Columbia Maryland West Virginia Middle Atlantic Virginia South Carolina Georgia Florids South Atlantic	3.17 8.31 8.01 6.34 6.34 6.38 4.61 3.70 3.43 6.99 3.58 3.24 4.14 2.09 3.55 3.78 3.91 4.61	15.24 8.93 10.24 8.05 10.92 11.36 12.36 11.61 9.61 12.77 11.69 10.86 9.87	15.06 9.19 10.68 8.79 11.71 7.96 9.40 7.84 8.75 9.45 7.80 7.43	33.47 24.41 26.13 22.96 27.91 24.27 24.67 23.69 24.94 22.89, 23.44 23.96	29.72 25.20 24.66 21.98 27.02 25.71 24.72 25.74 20.01 21.70 22.74 22.56
Rhode Island Commetieut New England New York New Jersey Pennsylvania Delaware District of Columbia News Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	5.01 5.34 5.28 4.93 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	10.24 8.03 10.92 11.36 10.66 12.36 11.51 9.51 11.51 12.77 11.69	10.88 8.79 11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43 8.12	24.41 26.13 22.96 27.91 24.27 24.67 23.90 23.69 24.94 22.89 23.44 23.96	24.66 21.96 27.02 23.71 24.72 23.74 23.01 21.70 22.74 22.55
Connecticut New England New York New Jersey Pennsylvania Delaware District of Columbia Neryland Nert Virginia Middle Atlantic Virginia South Carolina Georgia Florida South Atlantic	5.34 5.28 4.93 4.01 3.70 3.43 5.99 5.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	8.83 10.92 11.36 10.66 12.56 11.51 9.51 11.51 12.77 11.69	8.79 11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43	22.96 27.91 24.27 24.67 23.69 24.94 22.89 23.44 23.96	21.96 27.02 25.71 24.72 23.74 23.01 21.70 22.74 22.56
New England  New York  New Jersey  Pennsylvania  Delsware  District of Columbia  Naryland  Nest Virginia  Middle Atlantic  Virginia  North Carolina  South Carolina  South Atlantic	5.28 4.93 4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.51	10.92 11.36 10.66 12.36 11.51 9.51 11.51 12.77 11.69	11.71 7.98 9.40 7.84 8.75 9.44 7.80 7.43 8.12	27.91 24.27 24.67 23.90 25.69 24.94 22.89, 23.44 25.96	27.02 25.71 24.72 25.74 25.01 21.70 22.74 22.56
New Jersey Pennsylvania Delaware District of Columbia Maryland West Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	10.68 12.36 11.61 9.51 11.51 12.77 11.69	7.98 9.40 7.84 8.75 9.44 7.80 7.43 8.12	24.27 24.67 23.90 23.69 24.94 22.89 23.44 23.95	24.72 23.74 23.01 21.70 22.74 22.55
New Jersey Pennsylvania Delaware District of Columbia Maryland West Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	4.61 3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	10.68 12.36 11.61 9.51 11.51 12.77 11.69	9.40 7.84 8.75 9.44 7.80 7.43 8.12	24.67 23.90 23.69 24.94 22.89, 23.44 23.96	24.72 23.74 23.01 21.70 22.74 22.55
Pennsylvania Dalaware Dlatriot of Columbia Maryland West Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	3.70 3.43 5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	11.61 9.61 11.61 12.77 11.69	8.75 9.44 7.80 7.43 8.12 7.80	23.69 24.94 22.89, 23.44 23.96	23.01 21.70 22.74 22.55
District of Columbia Maryland West Virginia Middle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	5.99 3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.61	9.51 11.51 12.77 11.69 10.86 9.87	9.44 7.80 7.43 8.12 7.80	24.94 22.89 23.44 23.96	21.70 22.74 22.55
Maryland West Virginia Widdle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	3.58 3.24 4.14 3.09 3.55 3.78 3.91 4.81	11.51 12.77 11.69 10.86 9.87	7.80 7.43 8.12 7.80	22.89, 23.44 23.96	22.74 22.55
Widdle Atlantic Virginia North Carolina South Carolina Georgia Florida South Atlantic	4.14 8.09 3.55 3.78 3.91 4.51	12.77 11.69 10.86 9.87	7.43 8.12 7.80	23.44	22.55
Virginia North Carolina South Carolina Georgia Florida South Atlantic	3.09 3.55 3.78 3.91 4.51	10.86	7.80		23.68
North Carolina South Carolina Georgia Florida South Atlantic	3.55 3.78 3.91 4.81	9.87			
South Carolina Georgia Florida South Atlantie	3.78 3.91 4.51			21.75	21.46
Georgia Florida South Atlantie	3.91 4.51		7.10	20.90	20.72
South Atlantie		8.69	6.12	18.72	18.96
		7.29	7.26	19.06	18.75
	3.77	9,28	7.14	20.19	20.12
Ohio Indiana	2.80	12.78	9.51	25.09	23.54
Indiana Illinois	2.70 3.14	12.65	11.42	26.77	26.54
Wichigan	2.58	13.91	10.25	26.71	25.26
Wisconsin	2.42	14.12	13.10	29.64	27.62
East North Central	2.73	13.02	10.93	26.68	25.27
Minnesota	2.99	19.08	13.10	35.17	33.06
Iown Missouri	3.62	15.35	7.59 8.25	26.76	25.09
North Dakota	3.51	22.98	9.76	36.25	32.20
South Dakota	5.42	16.75	1.40	23.67	21.32
Nebraska Kansas	8.39	21.05	2.74	30.92	26.81
West North Central	3.82	15.73	8.63	28.18	26.76
Kentucky	3.76	10.38	8.26	22.40	21.06
Tennessee	8.70	10.20	7.06	20.96	20.03
Alabema Mississippi	4.21 5.42	9.70	6.60	20.51	19.91
East South Central	4.22	9.90	6.95	21.07	20.38
Arivana	4.01	9.96	9.85	24.62	24.05
Louisiana	5.18	10.77	6.44	22.39	21.48
Oklahoma	4.46	14.68	6.00	25.14	20.28
Texas	4.43	11.49	5.33	21.25	20.28
West South Central	4.71	11.24	6.78	22.78	21.62
Wontana Idaho	9.45	19.36	2.23	31.04	31.60
Wyoming	9.00	20.47	2.85	32,32	34.44
Colorado	9.50	18.77	5.80	34.07	34.59
New Mexico Arisona	10.37	13.35	1.52	25.39	25.47 26.15
Utah	9.08	15.98	2.85	27.16	27.70
Sevada	7.60	13.98	3.34	24.92	24.86
Mountain	9.81	16.84	8.42	30.07	29.40
Washington	6.09	11.07	9.47	26.65	25.32
Oregon California	7.31	9.98	9.20	30.65	29.73 24.58
Pacific Continental U. S.	9.30	10.69	6.31	26,20	25.13
Haunii	3.88	11.03	8.23	23.14	22.47
Puerto Rico	11.68	6.18	15.40 9.94	35.09	35.72 25.65
Territories	10.84	6.46	10.78	28.08	27.18
U. S. Average: 1949-50	4.02	10.93	8.29	23,24	
1948-49- 1947-48	3.99	10.78	7.78	22.55	

materials was but 59,610 tons compared with 80,504 tons in 1948-49: due primarily to a decrease in shipments of manure salts from 48,765 tons to 18,775 tons. In the Atlantic Coast Region and in the Territories distribution of manure salts was only a little less than in the previous year,

but distribution in all the other Regions was about one-half of the tonnage as compared with 1948-49.

The distribution of minor and secondary element materials decreased from 509,565 to 439,507 tons, as the result of less distribution of gypsum, which was only 394,372 tons compared with 461,638 tons in 1948-49.

### **Plant-Nutrients**

OMMERCIAL fertilizers supplied to United States agriculture 4,061,529 tons of nutrients in the year ended June 30, 1950. This consisted of 1,005,452 tons of nitro-

TABLE 5

Principal Fertilizer Materials Consumed as such, by States and Regions, During Year Smired Jame 50, 18801/

State A Region		Ammonium		Solium	Chascal Chasical Sitrogen Waterials	Bried Manares	Organica2/	Phospints Rock3/	Superpho 18-20 Parceas	19-60	Other Prosphates!	Norists of Potask 50 a 885	Potash	Minor and Secondary Elements	1
Waine	598	394	292	480	25	693	149	74	17,721	0	181	28		38	30,829
New Heapphire	226	43	18	818	81	605	106	40	10,281	23	390	189	67	34	
Verwoot	103	1	80	189	87	72	159	112	30,723	0	303	897	0	93	
Mesendusette	488	391	316	1,472	99	1,999	6,617	323	10,480	0	940	866	0	17	20,840
Shode Island Connecticut	287	45	19	1,280	113	991	17,429	362	12,254	28	1.388	1,411	1,793	398	37,463
Now England	1,793	734	970	8,771	338	4,361	22,503	899	83,621	1	2,903	2,636	1,067	672	126,722
		439	and or the second	-	. 981	3,742	4,160	430	185,821	-	933	818	92	411	187,751
New York New Jersey	3,446	144	1,806	4,905 2,733	147	2,178	1,866	381	10,025		1,320	1,119	23	1,897	23,882
Pegnaylwania	800	342	929	2,385	230	3,649	3,568	3,300	90,761	83	1,700	566	68	2,326	110,882
Delamare	654	1	48	282	50	110	26	100	1,076	0	45	16	1	9	3,138
District of Columbia	0	0	1	65	0	101	165	0	44	0	114	1	0	60	629
Waryland	840	23	632	3,156	392	1,084	140	341	22,441		380	176	19	216	29,386
Sest Virginia	108	203	16	838	278	196	61	80	39,212	-	63	34	-		44,548
Widdle Aglantic	6,117	1,160	4,723	14,268	2,078	10,090	10,818	4,840	330,186	-	4,638	2,528	808	4,800	399,028
Virginia	8,980	984	1,222	80,716	10,008	473	642	890	74,626	7,491	4,078	969	163	10,097	144,225
Morth Carolina	8,902	1,061	ZN., 828	101,145	43,541	83	3,441	610	47,276	1,345	12,167	7,300	3,976	30,206	346,838
South Carolina	15,604	1,000	5,820	103,079	34,088	190	749	1,176	71,861		27,422	7,860	7,220 8,090	3,293 17,464	285,175
Georgia Florida	12,808	1,207	2,066	14,200	12,221 6,641	1,048	7,527	12,135	17,429	83	6,996	3,063	14,364	3,179	93,306
South Atlantic	42,368	8,873	36,870	606,482	106,700	2,571	15,287	14,443	306,661	9,400	60,699	20,550	81,800	64,230	1,129,046
						-	-		-	-		822	28	0	1
Onio Indiana	4,278	6,330 473	1,593	1,371	1,611	1,885	1,550	36,342	28,788		1,176	1,797	177	154	85,028
Illinote	10,745	1,006	870	277	95	4,072	6,416	452,608	41,600		3,001	14,840	3,351	16	548,437
Wichigan	6,783	1,904	147	7161	233	1,882	7,066	2,320	44,406	8481	186	467	3	613	66,698
Wisconsin	6,698	\$20	801	6.0	170	676	3,571	10,854	22,270	661	407	1,438	1,038	342	48,483
Best North Control	61,367	9,038	4,880	2,051	2,493	0,216	25,346	610,941	165,569	13,863	5,117	10,462	4,592	1,106	621,454
Winnesste	3,362	145	2	0	160	640	2,566	3,390	40,266		1,423	201	0	1,054	74,128
low.	16,782	282	160	0	100	100	1,212	25,097	02,163		5,469	1,376	6	142	144,632
Wissouri	22,144	305	42	214	2,047	554	1,013	75,372	25,296		813	2,267	256	400	144,478
North Dakota South Dakota	304 630	48			40	1 15	90	126	1.613	626	0		0	400	4,320
Hebranks	21,679	549		0	140	76	282	806	3,932		628	87	0		34,822
Ennese	25,427	1,421	1		67	199	410	26,961	12,516	46,676	776	66	4	0	113,323
West Sorth Control	91,107	2,656	206	219	2,500	1,704	6,368	130,931	164,803	104,484	9,242	4,000	245	1,462	620,192
Bestucky	19,897	604	3,342	1,669	206	247	245	24,802	136,313	14,134	2,702	878	3,747	102	207,288
Tennesses	22,464	1,100	978	15,484	3,438	882	807	1,606	82,284		32,378	8,940	1,491	238	185,785
Alabasa	34,792	5,386	1,421	87,881	1,782	543	194	480	98,490	2,064	143,308	4,921	2,870	820	379,954
Wississippi	105,670	14,156	7,784	46,410	31,200	35	50	1,109	66,445	1,947	74,760	13,998	2,070		343,747
East South Central		21,048	12,425	181,452	38,314	1,208	1,086	27,987	379,612	20,642	243,145	22,737	10,178	869	1,116,774
Arknosse Louisiana	40,213	1,640	6,740	10,447	6,680	19	1,334	0,110	69,990 27,169	2,470	15,508	9,462	3,200	3	167,021
Chishoma	4,063	470	2,076	163	0,952	214	823	30,142	41,000	4,134	642	4,673	983	0	81,960
Texas	18,871	8,318	8,139	2,052	1,801	1,471	969	15,617	176,878	28,007	41,081	785	18	4,752	300,721
Meat South Control	100,477	5,992	14,565	66,763	17,436	1,780	2,562	54,149	315,017	33,466	86,872	15,140	3,671	4,755	672,601
Bostana		110		0	80	0	90	0	12	0,124	0	8	0	390	8,808
Idebo	3,193	8,798		0	380	0	30		16,780	11,982	342	63	0	3,794	44,140
Ryoni og	240	64		0	48	0)	0	10	788	3,030	80		01	808	4,396
Colorado	2,192	5,804	20	178	120	131	660	40	1,475	11,219	815	346	120	588	23,049
New Marino	1,506	986	80	41	2,465	0	136	0	936	6,806	6,401	40	0	0	19,662
Artiona Stab	2,004	99.5	883	1,838	11,404	2,068	112	80	2,616	6,613	9,930	30	542	800	64,263
Neveda	0	3,647	0		0	8	0	0	4,381	8,348	0	0	0	333	15,611
Mountain	14,764	15,004	981	1,472	14,486	Z,494	1,707	340	25,870	49,632	13,138	467	462	14,007	156,014
Realington	0,734	5,400	295	804	8,718	3,024	4,008	5,836	10,062	3,006	10,433	2,454	71	2,454	54,478
Crasus.	11,060	15,230	542	942	2,067	34	783	400	15,090	4,934	13,620	1,666	208	5,780	72,162
California	64,621	90,620	6,675	1,450	78,276	130,000\$	39,421	629	80,642	14,132	58,083	2,475	2,082	339,258	072,269
Pactfic	71,384	111,269	6,628	3,124	77,046	185,027	46,180	4,186	86,602	22,078	82,036	6,804	5,161	347,402	100,689
Continental U. S.	-	179,420	81,677	627,387	258,674	165,217	127,054	748,668	1,854,026	264,913	476,790	101,181	66,178	439,382	5,941,689
(erritorios	17,978	56,244	1	67	6,002	8	110	887	1,961	242	10,236	0,130	3,432	125	104,115
Total, 1949-50	577,542	234,064	81,578	627,424	264,076	145,210	127,966	749,253	1,856,777	265,166	487,028	100,200	69,610	439,607	6,045,704
1940-49	347,225	220,043	63,986	700,045	231,228	134,481	123,744	742,700	1,704,719	196,290	472,546	96,108	80,504	809,565	8,702,379
1947-49	347,347	811,226	76,068	697,480	146,601	99,850	103,096	777,427	1,847,297	166,063	490,656	56,729	56,710	625.804	6,607,321

Includes distribution by deverment agencies, materials for mixing on the farm, and gypeum. Dicludes materials used by manufacturers in the formulation of commercial mixtures, and agricultural line.
Tonomages of principal commendities are shown in Table 6.
Includes 20,780 toms of colloidal and soft phosphate.

Estimated.

gen, 1,951,385 tons of available phosphate oxide (P<sub>2</sub>O<sub>5</sub>) (total phosphoric oxide was 2,291,722 tons), and 1,104, 692 tons of potash (K<sub>2</sub>O). The tonnages consumed in each State are in Table 7. The 1949-50 figures for N, available P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O are 9.3, 0.5, and 2.9 percent larger, respectively, than those for 1948-49; and 17.4, 5.3, and 20.0 percent larger than for 1947-48.

The tonnage of commercial

mixtures in 1949-50 was 530,574 tons or 4.1 percent less than for 1948-49. The nutrients supplied in 1949-50, however, were only 35,102 tons or 1.2 percent less than for 1948-49. This was due to the more general use of higher analysis mixtures in 1949-50.

Shipments of separate materials that contained N, P<sub>2</sub>O<sub>5</sub> or K<sub>2</sub>O were 413,383 tons more than for 1948-49. Total nutrients supplied by all separate materials were 1,200,453

tons, an increase of 161,903 tons over the 1948-49 figure. The additional nutrients supplied by the larger tonnage of separate materials together with the use of higher analysis mixtures and materials resulted in a netincrease of 3 percent more nutrients than for 1948-49, although the tonnage of all fertilizer shipments was one percent less.

Table 7 appears on page 100

Table 6

Commercial Fertilizers Consumed in the United States for Direct Use on the Land. Year Ended June 30, 1950<sup>1</sup>

Commodity	Quantity	Commodity	Quantity	
Wixtures		Ammoniated superphosphate	1,681	
N-P-X grades	11,197,502	Basic lime phosphate	3,473	
N-P grades	178,471	Basic slag	287,419	
P-K. grades	831,220	Bonemeal, raw	6,791	
N-K grades	73,849	Bonsmeal, steamed	5,679	
K grades	27,890	Calcium metaphosphate	10,343	
		Calcium magnesium phosphate, fused	5,034	
Chemical nitrogen materials		Fused tricaleium phosphate	15,598	
Asmonia - anhydrous	85,516	Phosphorie acid	6,900	
Ammonia - aqua	10,560	Phosphate rock	728,533	
Ammonium nitrate	577,562	Colloidal phosphate	20,720	
Ammonium nitrate-limestone mixtures	102,205	Precipitated bone	460	
Ammonium nitrate solutions	11,108	Superphosphate, 18%-20% PoOs	1,856,777	
Ammonium sulfate	234,664	Superphosphate, 29%-50% Poos	265,160	
Calcium eyanemide	81,578	Other phosphates	1,186	
Calcium nitrate	22,156			
Sodium nitrate	627,424	Potash		
Urea	18,339	Cotton hull ash	1.571	
Other chemical nitrogen materials	14,792	Manure salts, 22%-30%	18,778	
	,	Muriates, 50% and 60%	109,289	
Organica		Carbonates	89	
Bat quane	339	Magnesia sulfates	5,300	
Blood, dried	1,299	Nitrates	8,536	
Castor pomace	10,428	Polysulfides	95	
Compost	2,277	Phosphate ash	2,430	
Cottonseed meal2/	13,296	Sodium nitrates	2,094	
Fish serep and meal	2,367	Solutions	106	
Hoof and horn weal	164	Sulfates	13,902	
Linseed weal	925	Tobacco stems	308	
Namures, dried	165,219	Wood ashes	5,276	
Peat2/	60	Other potash materials	1,148	
Peamut meal	81	Const. Posterio antoniano	1,140	
Sewage sludge, activated	61,791	Winor and secondary elementa2/		
Sewage sludge, other	27,740	Aluminum sulfate	30	
Soybean meal	170	Borax	1,913	
Tankage, animal	1,523	Copper sulfate	287	
Tankage, garbage	1,406	Land plaster (gypsum)	394,372	
Tankage, process	2,751	Magnesium sulfate	173	
Tung pomace	116	Manganese sulfate	363	
Other organics	1,231	Soil sulfur, 25%-99+% S	22,208	
Orner or Eurites	1,002	Sulfuric acid, 40%-93%	4,825	
hosphates		Zine sulfate	9,025	
Armonium phosphate, 11-48	19,935	Winerals not segregated	15,254	
Amonium phosphate, 16-20	121,640	BYTHALETS HOS SAFLAGEROOD	10,204	
Amonium phosphate, 13-39	887	Total	18,354,636	

If Includes distribution in the Territories and by Government agencies. Does not include shipments of materials for manufacture of commercial mixtures.

<sup>2/</sup> Excludes similar materials distributed by other than mammfacturers of commercial fertilizers.

## **Tells Delaney Committee:**

# Pesticide Lack Means An Inadequate Food Supply

CINCE food is perhaps the most basic of all needs, America is fortunate to have been endowed with an abundance of Grade A agricultural land, and provided with a surplus of food stuffs. Now, however, as population increases and agricultural resources are depleted through exploitation and misuse, the potential and actual food surpluses are dwindling. More and more we must look to increased efficiency in production and conservation to supply our needs. Improved cropping and soil conservation practices, together with the proper use of fertilizers to improve and properly balance eroded and practically depleted soils, have greatly aided our farmers in increasing production. The judicious use of pesticides has likewise contributed to increased production and has added greatly to the conservation of the crops produced. We must, however, increase our efficiency in all of these efforts if we are to keep pace with the ever-increasing demand for even greater quantities of healthful, nutritious food. We have made much progress, but we still have far to go in attaining real efficiency and conservation, hence nothing should be done to unnecessarily hinder or retard scientific prog-

Plant and animal pests rank among the foremost causes of food destruction, food deterioration, and food contamination, and the necessity of protecting growing crops and produce from serious attack by insects, plant diseases, and other pests is quite obvious to all concerned. In recent years science has placed in the hands of the farmer, the food handler, and the food processor many valuable chemical tools or weapons, commonly referred to as pesticides, to aid them in their unending was with pests of all types.

#### Necessity for Pesticides

AT least 3,000 species of insects and twice as many disease agents attack crops. Some of these destroy plants outright while others reduce the yield by ten percent or more and impair the quality of produce. Apple growers, for example, must protect the crop from about 100 insect pests and 200 infectious diseases.

Some may insist that they would rather eat a scabby apple or a wormy peach than a chemically treated fruit. That choice might be available to the suburbanite with a fruit tree in his back yard, but it would not long be available to the average American consumer if the use of pesticides were prohibited or unjustifiably curtailed. Last fall I spent several hours in an 80-acre orchard that had not been sprayed

for three years. There were thousands of bushels of apples on the trees and on the ground, but I could not find a single apple that would pass inspection in a commercial pack.

The damage by these plants and animal pests can be and is reduced somewhat by mechanical, ecological, and biological control methods, but such are wholly inadequate to obtain effective control.

There is abundant evidence that our fruit, vegetable, and other staple crops cannot be produced economically, efficiently, and in an adequate quantity without chemical protection from insects, plant diseases, weeds, and other pests. To deny agriculture the use of these chemical tools would be to jeopardize our agricultural economy and an adequate, well-balanced food supply for the American public. Uninhibited insect and plant diseases would largely eliminate the commercial production of such crops as apples, peaches, citrus fruits, tomatoes, and potatoes, to mention only a few, and would curtail drastically the production of many other major crops.

The necessity for using pesticides presumably requires no further amplification here, as this necessity was fully established in the thousands of pages of testimony taken in the course of the recent public hearings conducted by the Food and Drug Administration (Docket No. FDC-57). The desirability, if not indeed the necessity, of pest control may be exemplified by a quotation from Com-

#### by George C. Decker

Head. Economic Entomology Section Illinois Natural History Survey and Illinois Agricultural Experiment Station. Urbana, Illinois

(From testimony before Delaney Committee, Washington, D. C., May 2, 1951)



missioner Paul B. Dunbar's Annual Report of the Food and Drug Administration, 1947, p. 502: "The wastage of food consumed or defiled by rodents and insects during a period when millions of people throughout the world are hungry is tragic and inexcusable."

#### Need for a Wide Choice

TiME was when the entomologists and the plant pathologists were called upon to do the best they could with a few pesticidal chemicals such as sulfur, copper salt, a few arsenicals, and nicotine. Today, approximately 100 pesticidal chemicals are in use or available for use, and over 30,000 pesticides have been registered for labeling and use by the Insecticide Division of the U. S. Department of Agriculture.

Each pesticidal chemical has its distinct advantages, disadvantages, and special uses. Therefore, just as the physician and the pharmacist require a generous assortment of pharmaceuticals for the compounding of prescriptions, so, too, the agriculturist and the pesticide dealer should have ready access to the largest possible assortment of chemicals so that likewise they may prescribe specific treatments to fit specific conditions. To argue that the agriculturist should be drastically limited in his choice of material would be tantamount to arguing that the physician and the veterinarian should be limited to the use of sulphur, spirits of ammonia,

and herbs, and should be denied the use of sulfa drugs and the new antibiotics.

#### Hazards Involved

M OST pesticides have some toxic properties. If they did not have these properties they undoubtedly would not control pests and therefore would not be pesticides. "Toxicity" and "hazard" obviously are not synonymous terms. Toxicity is the capacity of a substance to produce injury; hazard is the probability that injury will result from the use of the substance in the quantity and in the manner proposed.

In evaluating the hazards involved in the use of pesticides, one must distinguish between the use or operational hazards, which might affect employees of the manufacturer, processor, or user; and the food contamination hazards, which might affect the consumer of the end product.

In general, use hazards are related to acute toxicity and may be measured in terms of the relative toxicity of the pesticide and the degree of exposure to it. The user should be fully informed through proper labeling and instruction as to the hazards involved. He should then be at liberty to make a free choice from the materials available and assume full responsibility for his actions. All accidents are deplorable and every reasonable effort should be made to reduce operational hazards to a minimum. However, it should be recognized that farm accidents involving the use of pesticides and other chemical tools are insignificant when compared with farm accidents involving the use of mechanical tools. In my home state, Illinois, there are over 1,000 occupational farm accidents annually. Approximately 200 of these involve fatalities and 300 or more involve amputations or other permanent injuries, but practically none are chargeable to the use of pesticide chemicals. If we can believe the record, there is greater danger that a farmer will be killed or permanently disabled by falling from a spray rig than there is that he will

be seriously injured by the poisonous chemicals he puts into the sprays out of the spray tank.

Food hazards are, in general, closely related to the chronic toxicity of the pesticidal chemical involved and may not be measured in terms of the chronic toxicity of the chemical and the amount of residue remaining on or in food reaching the consumer.

The inherent toxicity of a pesticide or pesticidal chemical to warmblooded animals may have little or no direct bearing on the final food hazard. In many cases the more toxic materials such as parathion, lindane, and aldrin, are applied at times when the edible portion of the crop is not exposed. As a rule, such chemicals are applied in proportionately smaller amounts than are less toxic materials and frequently the more toxic compounds are short-lived. In other words, they are quickly destroyed through chemical change or lost through decomposition or evaporation. It would not, therefore, be in the public interest to deny entomologists and agriculturists access to valuable pesticides strictly on the basis of their inherent toxicity to warmblooded animals. Fruit and vegetable growers should not be denied the right to use a pesticidal chemical, no matter how poisonous, provided its use as recommended does not endanger the public health.

Basically only two factors are involved in determining the magnitude of any food hazard that may develop or exist where pesticides are used in the production of a food cron. They are (1) the inherent toxicity of the pesticidal chemical used, and (2) the magnitude of the residue—in other words, the actual amount of the active chemical—remaining on or in the food when it reaches the market or is ready for consumption.

As previously indicated, a very large percentage of all pesticidal chemicals used are applied at times, places, and in ways that do not involve a food contamination hazard. It would appear, therefore, that any inadvertent restriction on the manufacture, sale, and use of new

and potentially valuable pesticides intended for many meritorious and perfectly legitimate uses, under the guise of food protection, would not be in the public interest and would effect a great and unjust hardship in many cases.

The past record of pesticides usage is apparently not bad. Despite the use of millions of pounds of pesticidal chemicals annually for the past five years, there are very few recorded deaths attributable to insecticides, and all of them were apparently due to operational hazards and/or misuse of the material. I know of no accidental deaths actually attributable to pesticidal residues in or on food. Again citing the record in my home state, Illinois, I find that in 1948, of the 5,762 accidental deaths in the state, the largest number, 1,950, involved automobiles. Only 104 were listed as accidental poisonings, and over half of these (56) were attributable to barbituric acid and its derivatives. Only three deaths involved pesticidal materials, and in all cases the accidents were due to carelessness in storage and misidentification of the materials. None was chargeable to residues in or on foods. Very similar data are compiled each year by the National Office of Vital Statistics of the Federal Security Agency

It would be ideal if all foods could be kept entirely free from any trace of poisonous or otherwise deleterious substances, and insofar as pessible we should be and are exerting every effort to approach such a goal. It seems to me, however, that we must continue to draw some line of distinction between intentional additives or functional chemicals, which are deliberately added to impart some special quality or attribute to a food, and incidental additives, which are not introduced into foods by design but which may be present in small or trace amounts following the normal and necessary steps in production and processing. It has been conceded by all concerned, including the Congress of the United States, that at times the last traces of certain pesticides, which are of necessity

used in the production of certain crops, cannot be entirely eliminated. In such cases the Food, Drug, and Cosmetic Act of 1938, Section 406-(A), directs the Secretary (Administrator) to "... promulgate regulations limiting the quantity therein or thereon to such an extent as he finds necessary for the protection of public health..." It seems to me that this and other provisions of the present Food and Drug Act afford the public a very large and perhaps adequate degree of protection from the serious hazards of food contamination by pesticides.

As a matter of fact, in reyiewing the last five annual reports of the Food and Drug Administration. I find recorded literally hundreds of seizures of foods and food products each year, mostly attributable to decomposition, insect or rodent infestations, and other filth in foods, the latter in a very large measure due to insect and plant disease infestations in the ingredients. In the same five years, only 34 seizures were recorded as due to insecticidal residues (1946-20; 1947-11; 1948-1; 1949-2; 1950-0. All of these seizures were attributed to lead arsenate residues in excess of the tolerance. The 1947 Annual Report of the Food and Drug Administration states (p. 498): "Surveys of the effects of using DDT, which is being substituted to a considerable extent for lead arsenate as an apple spray, did not disclose objectionable residues." This is in accord with the finding of research workers in several states, including our own findings in Illinois. Incidentally, these findings may debunk several unfounded fears, for in our work with seven new insecticides in Illinois we have found DDT residue to be the most persistent.

The public is afforded still further protection by the Federal Insecticide, Fungicide, and Rodenticide Act of 1947, which became ef-

fective in June, 1948. Under this Act, all economic poisons (pesticides) must be registered with the United States Department of Agriculture before they can enter interstate commerce. Before a pesticide is registered, the Department requires that the producer present his labels for review and satisfactorily establish all claims thereon. The Act provides that the label must bear adequate caution or warning statements, directions for use, and such additional information as will, if properly complied with, afford adequate protection of the public. This act has been in force less than three years, and yet, in my opinion, it has done more than any other single piece of legislation to properly regulate and control the sale, distribution, and use of pesticides. Unreliable and hazardous products have been driven out of existence. The agricultural chemical industry is now practically free of the highly advertised yet questionable cure-all type of product that still plagues the drug trade.

In evaluating the problem of chemicals in food, the consumer should receive first consideration, but it is equally important that the food producer be adequately protected against unwise, unnecessary arbitrary actions. When we consider that the use of pesticides is essential to the successful production of many crops and that at the same time foods must be protected from excessive or harmful contamination, it would appear that Congress acted wisely in establishing a dual system of controls by the Food and Drug Administration and the Department of Agriculture. It may be that one or both Acts could be strengthened by minor amendments, but the continuance of the dual system of control appears to be advantageous and proper. In this way all interests are more nearly assured proper and adequate consideration and the probability of unjustifiable arbitrary actions is greatly reduced. \*\*

Distinction should be made between intentional additives, and those necessary for production and processing of foods, Dr. Decker testifies



Dr. Russell Coleman

President, National Fertilizer Association presents annual presidential address in June 13th session.

Below: The Greenbrier Hotel, scene of the 25th annual NFA Convention.

# NFA

Holds 26th Annual Convention June 11-13 at Greenbrier Hotel

WITH a meeting of its board of directors on June 11, the 26th annual convention of the National Fertilizer Association was to open at the Greenbrier Hotel, White Sulphur Springs, W. Va. J. E. Totman, president of Summers Fertilizer Co., Baltimore, Md., was to preside at this session, following which the NFA Plant Food Research Committee will hold an open meeting. Proctor Gull, chairman of the corn sub-com-

mittee was scheduled to preside at this latter session.

Speakers at the 26th annual meeting, according to advance announcement by the Association, were to include Sen. Clinton Anderson, New Mexico, former Secretary of Agriculture; E. G. Nourse, former chairman of the President's Council of Economic Advisers, who has recently received one of the John Simon Guggenheim fellowships for study in private enter-



**IUNE**. 1951



Sen. Clinton Anderson Speaks on "Number Your Freedoms"



E. G. Nourse
"Inflation is Fun While it Lasts"



Edward J. Condon Makes plea to "Save Our Land"

prise; and Edward J. Condon, president of the Friends of the Land and assistant to the president of Sears, Roebuck & Co.

Dr. Russell Coleman, president of the National Fertilizer Association was to appear on the program with his annual presidential address.

Committees in charge of various phases of the convention are as follows:

#### Men's Golf Events

Chairman: A.L. Walker, Jr., Texas Gulf Sulphur Company, New York; F. W. Darner, U. S. Phosphoric Division, Tennessee Corporation, Tampa, Florida; John W. Hall, Potash Company of America, Washington, D.C.; B. H. Jones, Sunland Industries, Fresno, California; J. W. Rutland, International Minerals & Chemical Corp., Chicago, Illinois; and R. S. Rydell, Swift & Co., Plant Food Division, Chicago.

#### Ladies' Golf Events

Chairman: Mrs. E. M. Kolb, Ridgewood, New Jersey; Mrs. J. P. Brinton, Hydrocarbon Products Co., Inc., New York; Mrs. E. A. Geoghegan, Southern Cotton Oil Company, New Orleans, Louisiana; Mrs. Norman Into, Lake Forest, Illinois; and Mrs. Wesley W. Johnson, Stadler Fertilizer Company, Cleveland, Ohio.

#### Tennis Committee

Chairman: James C. Totman, Summers Fertilizer Co., Bangor, Maine; George H. Dunklin, Planters Fertilizer & Soybean Company, Pine Bluff, Arkansas; Mrs. Garlan Glover, French Potash & Import Co., Inc., New York; Mrs. W. R. Morgan, International Minerals & Chemical Corp., Chicago; and Mrs. Frank Seymour, Goldsboro, N. C.

#### Bridge Committee

Chairman: Mrs. Ernest Russell, Hadley, Massachusetts; Mrs. Burton Ford, St. Regis Sales Corporation, Allentown, Pennsylvania; Mrs. R. D. Martenet, E. Rauh & Sons Fertilizer Co., Indianapolis, Indiana; Mrs. John A. Miller, Price Chemical Company, Inc., Louisville, Kentucky; Mrs. James Naftel, Pacific Coast Borax Company, Auburn, Alabama; Mrs. Weller Noble, Pacific Guano Company, Berkeley, California; and Mrs. C. D. Shallenberger, Shreveport Fertilizer Works, Shreveport, Louisiana.

#### Horseshoe Pitching Contest

Chairman: A. A. Schultz, Reading Bone Fertilizer Co., Reading, Pa.; H. G. Cunningham, Tennessee Corporation, Atlanta, Georgia; William Lehmann, Chilean Nitrate Sales Corp., New York; C. R. Martin, Miami Fertilizer Company, Xenia, Ohio; and H. A. Parker, Sylacauga Fertilizer Company, Sylacauga, Ala.

#### Ladies' Hospitality Committee

Chairman: Mrs. Louis Ware, International Minerals & Chemical Corp., Chicago; Mrs. Moultrie Clement, Merchants Fertilizer & Phosphate Co., Pensacola, Florida: Mrs. Russell Coleman, Washington, D. C.; Mrs. Franklin Farley, International Minerals & Chemical Corp., Chicago; Mrs. John Fletcher, United States Potash Co., Atlanta, Georgia; Mrs. Fred S. Lodge, Washington, D. C.; Mrs. J. H. Owens, care Roanoke Guano Company, Roanoke, Alabama; Mrs. James E. Totman, Baltimore, Maryland; Mrs. Tom Ware, International Minerals & Chemical Corp., Chicago, Illinois.

#### Men's Hospitality Committee

Chairman: J. H. Daughtridge, E. I. du Pont de Nemours & Co., Wilmington, Delaware; Paul Ausley, (Turn to Page 103)

#### J. E. Totman

Chairman of NFA Board makes address. presides at meeting, and at banquet.



# of 48 States, 43 regulate sales and 34 require annual registration, fees via

# PESTICIDE LAWS

A LL manufacturers of insecticides, fungicides, disinfectants, and other products classified as "economic poisons", who distribute their products in the various States, are subject not only to Federal legislation and regulations covering interstate shipments but to 43 different State laws (including Hawaii). Thirty-five of these laws require annual registration and, with the exception of four, provide for a registration or "inspection" fee.

There is probably no other industry that is compelled to comply with as many laws and regulations in order to sell its products.

The Federal Act provides for registration, but without any fee. Annual registration is not required but the Secretary of Agriculture "is authorized to cancel the registration of any economic poison at the end of a period of five years, . . . or at any five year period thereafter, unless the registrant, prior to the expiration of such five-year period, requests in accordance with regulations issued by the Secretary that such registration be continued in effect."

(Laws of those States followed by an asterisk also include in their coverage rodenticides and herbicides.) A summary of various State laws follows:

Alabama, Insecticide, Fungicide Law

Registration required annually, Year October 1—September 30. Fee \$10.00 for each brand, or \$11.00 if offered for sale before registration.

Arizona\*. Economic Poisons Act

Annual registration. Year January I—December 31. Fee \$25.00 for the first and \$10.00 for each additional product registered. The Act does not cover household insecticides, disinfectants and deodorants. Provided, however, by regulation (which has the "force and effect of law"), that "any economic poison, which may be used for purposes falling within the provisions and intent of the Economic Poisons Act but labeled or sold as a household insecticide or economic poison in containers of one gallon or more as a liquid, or its approximate equivalent in

weight of eight pounds or more in solid or powder form, shall be classed as an 'economic poison' within the Economic Poisons Act and must be registered."

C. C. McDonnell

Arkansas\*. Economic Poisons Act

Registration annually provided that "An economic poison need not be registered if the name and percentage of each active ingredient is given on the label", and provided further that products "registered in compliance with Federal laws of the same intent and purpose as this Act" are exempt from registration. Registration renewable July 1. Application fee \$15.00 for each economic poison "if the applicant gives the Board (State Plant Board) his formula and \$30.00 if he does not", and an additional fee of \$5.00 for registration if the application is accepted.

Under the State Pest Control License Act, all persons who shall, for compensation, give advice or engage in pest control work, must procure a license. Operators license annual fee \$5.00, and those who solicit work must have a "salesman's" license, annual fee \$3.00.

Calif\*. Agri. Code, Economic Poisons

Registration annually. Year July 1—June 30. Fee \$5.00 for one to ten economic poisons and \$2.00 for each

This article by Dr. McDonnell presents the latest information available on state laws and regulations covering economic poisons. Dr. McDonnell was chief of insecticide division of the USDA until his retirement in 1945.

product over ten, provided "If renewal of registration is not applied for within one calendar month after the expiration of a registration, there shall be added to the fee a penalty of 10%, to which shall be added an additional penalty of 5% of the original amount due, for each succeeding calendar month, but the total penalty shall not exceed 50% of the original amount due." (There is no penalty if the registrant makes an affiidavit that no business was done during the period of nonregistration.)

The Act does not apply to preparations, drugs or chemicals intended to be used solely for medicinal use by humans, or for toilet purposes, and "germicides, disinfectants, or sterilizers for hospital, dental, tonsorial, or purely medicinal uses; or for swimming pools, or for glassware in drinking establishments, or other involvement of public health outside the field of agriculture and related activities; if the label and claims do not exceed these boundaries, shall not be registered." These products, however, if to be used in stables, dairies, creameries, poultry runs and houses, and "general agricultural and related uses", must be registered. (Reg. No. 6.)

Colorado\*. Insecticide, Fungicide and Rodenticide Act of 1947

Registration annually. Year July 1—June 30. Fee \$5.00 for each product registered, or any number of brands after the payment of annual fees aggregating \$50.00,

Florida, Insecticide and Fungicide Act of 1937

Applies to agricultural insecticides and fungicides and "other plant peats" which may be detrimental to vegetation. Registration annually. Year January 1—December 31. Fee \$125.00 "for a license to manufacture or sell agricultural insecticides" within the State, and a registration fee of \$2.50 for each brand registered.

Georgia\*, Economic Poisons Act

Registration annually. Year January 1—December 31. Fee \$5.00 for each brand or "grade", or any number of brands upon payment of annual fees aggregating \$200.00, The Act also provides that everyone who offers for sale within the State any product covered by

<sup>\*</sup>For a complete compilation of State Lawa see "Compilation of Economic Poisons Launa" published by Chemical Specialties Manufacturers Association, Inc., 110 East 42nd Street, New York 17, N. Y.

the Act, shall procure a "Dealers regulatory license" from the Commissioner of Agriculture (no fee), which "shall continue in force unless revoked"; and that any non-resident manufacturer or distributor shall, at the time of registration, designate to the Commissioner of Agricul-"an attorney in fact", residing within the State, on which attorney "legal service and process may be had" so as to bring non-resident manufacturer under the jurisdiction of the Courts of the State.

#### Hawaii\*, Economic Poisons Act

Registration annually. Year July 1-June 30. Fee \$5,00 for each economic poison registered. "Germicides, disinfectants or sterilizers for hospitals, dental, tonsorial or purely medicinal uses or other public health uses outside the field of agriculture, household use and related activities shall not require registration if the label and claims do not exceed these "Germicides, disinfectants boundaries. or chemical sterilizers to be used in stables. dairies, creameries, poultry runs, households and for general agricultural and related uses" must be registered.

#### Act 357 Relating to the Sale and Use of 2,4-D, and Related Weed Control Substances

Provides that before any person shall sell, or offer for sale, any product containing 2,4-D or "related weed control substances", such person shall obtain a license. Fee \$10.00 annually. Licenses expire on July 1 of each year. The Act also provides that all importers of 2,4-D, or related weed control substance, for sale within the Territory shall pay an inspection fee, the amount of which may be set from time to time but "shall not exceed a maximum of \$.02 per pound of the free acid equivalent of 2,4-D.

## Kansas\*, Agricultural Chemical Act of 1947

Registration annually. Year January 1-December 31. Fee \$15.00 per brand for the first ten, or any number of brands on payment of annual fees aggregating \$150.00.

Kentucky. Food, Drugs & Poisons Act The term "Drug" includes "Paris green and all other insecticides and fungicides." Labels are required to be filed with the State Board of Health. The Act provides that the State Board of Health "may fix reasonable fees for examining samples of . . . drugs or labels submitted by manufacturers or dealers to determine whether the products or labels comply with the provisions of the Act" "Whether a sample has been found to be adulterated or misbranded, the Board shall collect a fee of not more than \$15,00 to cover the costs of investigation or analysis.

#### Louisiana, Agricultural Poisons Act

Covers insecticides, fungicides and herbicides "where such substances are used, or intended to be used on field crops, vegetable crops, gardens, orchards, etc." Registration required, which is valid "until such time as it is cancelled by the guarantor, or cancelled for cause by the Commissioner, or it is deemed advisable by the Commissioner to review all registrations." There is no fee for registration but the Act provides that every guarantor or person manufacturing or elling any agricultural poison "shall pay to the Commissioner an inspection fee of ten (10) cents per hundred-weight (100) on all agricultural poisons sold in this State." . . . "The weight reports and inspection fees shall be due and payable on the first day of February." (Provides for a penalty of 10% if payment is not made within twenty days after due date.)

Regulations governing the sale and use of 2,4-D and related herbicides prohibit their use except under special permit issued by the Commissioner of Agriculture and Immigration. Provides also for liability for damage to "crops, orchards, gardens, or other valuable plants, other than that on the property being treated."

#### Maine, Insecticides, Fungicides

Registration annually. Year January 1—December 31. Fee \$10,00 for each brand, except "that said fee shall not be assessed for the registration of a fungicide or insecticide consisting of organic matter and not containing any added inorganic matter or mineral chemical, provided that a complete chemical analysis of said fungicide or insecticide is given in, and as a part of, the certificate required under this section. new bill is now pending before the State Legislature.)

#### Maryland\*, Insecticides and Fungicides Act

(The Act does not cover insecticides intended solely for household use.) Registration annually. Year January 1— December 31. Fee \$5.00 for each brand, or any number of brands on payment of annual fees aggregating \$75.00.

#### Michigan\*, Insecticide, Fungicide and Rodenticide Act of 1949

Registration annually. Year November 1-October 31, Fee \$5.00 for each brand for the first ten and \$2.00 for each brand in excess of ten.

#### Minnesota\*. Economic Poisons and Devices Law

Registration annually. Year July 1 - June 30. Fee \$5.00 for each product registered, with a maximum of \$25.00 for any number of brands. A penalty of 50% of the registration fee if application for registration is not made on or before July 1 of each year, or within "the same month such economic poisons are first manufactured or sold within

## Mississippi\*, Economic Poisons Act of 1950

Registration annually. Year January 1 - December 31. Fee \$5.00 each for the first five products, or any number of brands on payment of annual fees aggregating \$25.00.

#### Montana\*, Insecticide, Fungicide and Rodenticide Act of 1947

Registration annually; Provided "that any economic poison imported into this State, which is subject to the provisions of any Federal Act providing for the registration of economic poisons and which has been duly registered under the provisions of said Act, may, in the discretion of the Director (of the Food and Drugs Division of the State Board of Health), be exempted from registration under this Act, when sold or distributed in the unbroken immediate container in which it was originally shipped." (A lexter from the Director, dated January 16, 1951, stated, "We have proceeded on this basis." Action may be taken at any time, however, making registration compulsory.) No fee for registration is fixed

#### N. Hampshire\*. Economic Poisons Law

Registration annually. Year January 1 - December 31. Fee \$10.00 for each product registered, or any number of brands upon the payment of \$100.00.

#### New Jersey. Law of 1912. Insecticides

Applies only to insecticides for use against "insects which may infest vegetation." Registration annually. No fee. (Bill pending before the present Legiswhich follows closely the Federal lature Act, but provides for a fee for registration.)

#### New Mexico\*. Insecticide, Fungicide and Rodenticide Act of 1951

Requires registration annually. Fee \$2.00 for each brand registered.

#### North Carolina®, Insecticide, and Rodenticide Act of 1947

Registration annually. Year January 1 - December 31. Fee \$10.00 for each brand or "grade".

#### North Dakota\*. Insecticide, Fungicide and Rodenticide Act of 1947

Registration annually. Year January I — December 31. Fee \$5,00 each for the first five products and \$1.00 for each additional product. A penalty of 50% if application for registration is not made on or before January 1st of each year, or within the same month economic poisons are first manufactured or sold within the State,

#### N. D. Livestock Remedy Act

The terms of this Act include "all powders, sprays, dips, and other preparations for external use in the curing of scab or the eradication of ticks, lice, and other mites and parasites on livestock, poultry, or other domestic ani-mals." Registration annually. Fee \$6.00 for each product registered, but these products are covered by both of these Acts and may be registered under either

#### Ohio, Livestock Remedy Act

Coverage includes "preparations for external or internal use in the eradication of parasites in or on livestock, poultry or other domestic animals." Registration annually. Year January 1 — December 31. Fee \$25,00.

#### Oklahoma\*. Agricultural Chemical Law, Economic Poisons

Registration annually. Year January 1 — December 31. Fee \$2.00 per brand (minimum fee \$5.00), and any number of brands upon annual payment of \$25.00. (This Act has been amended, effective February 20, 19\$1, increasing the registration fee to \$5.00 for each brand, or \$50.00 for any number of brands.)

## Act Regulating Use and Application of Insecticides, Herbicides, Fungicides

Requiring permits and bonds for applicators and users. Permit fee \$25.00 for aerial applicators. Renewable annually. The Act provides that a surety bond shall be filed with the State Board of Agriculture guaranteeing "a faithful performance of any contract the applicant makes for the use or application of insecticides, herbicides or fungicides."

#### Oregon\*, Insecticide & Fungicide Law

Registration annually. Year January 1—December 31. Fee \$20,00 each for the first three brands; four and not more than 25 brands a flat fee of \$75.00, and \$2,00 for each brand in excess of 25

#### Penna. Insecticides and Fungicides

Registration annually. Year January 1—December 31. Fee \$5.00 each for the first five brands, and \$1.00 for each brand over five.

## South Carolina, Act Relating to the Sale of Agricultural Preparations

Applies to arsenical insecticides for boll weevil control and "any other material or preparation for the purpose of destroying, controlling or preventing injurious insects or plant diseases." Requires that "specifications" of same be filed with the State Crop Pest Commission. No fee.

#### Act Regulating the Sale of Commercial Disinfectants

Registration annually. Year January 1 — December 31. Fee \$10.00 for each brand, or a maximum fee of \$50.00 per annum, covering "all brands made by a single manufacturer."

#### South Dakota\*, Insecticide, Fungicide and Rodenticide Act of 1947

Registration annually. Year July 1—June 30. Fee \$5.00 each for the first five products, and \$1.00 for each brand in excess of five.

#### Aircraft Spraying and Dusting Law

Requires a permit from the State Secretary of Agriculture to "operate any aircraft in the application, distribution, dissemination, spraying or dusting of any area in this State." Application fee \$5.00, renewable annually.

#### Tennessee. Insecticides and Fungicides (Agricultural)

Registration annually. Year July 1 — June 30. Fee \$20.00 annually "for the privilege of dealing in insecticides and fungicides."

### Tennessee Insecticide, Fungicide and Rodenticide Law\*

(New law Effective June 1, 1951.) Provides for registration annually. Year July 1—June 30. Fee \$5.00 for each brand or "grade".

#### Texas\*, Insecticides & Fungicides Act

The Act covers insecticides and fungicides for use against pests which may infeet "agricultural crops, including fruits, vegetables, ornamentals, shade and forest trees: . . poisons and chemicals sold expressly for crop protection against rodents and rats", and "Any substance designed and offered for sale as a weed killer." Registration required annually. Year September 1—August 31. Fee \$25.00 for each product, provided that "the total of the registration fees for any one firm shall not exceed \$100.00." The Act does not cover insecticides or fungicides designed exclusively for livestock, poultry and houseflolds.

#### Texas Livestock Remedy Act

Includes (3) "preparations for external or internal use in the eradication of parasites in or on livestock, poultry or other domestic animals; . . . and articles intended for use as a component of any of these articles." Registration annually, Year January 1 - December 31 "not more than \$10.00 for each separate and distinct article registered; or a blanket fee of not more than \$100.00 of any manufacturer or person registering ten or more products: Provided, that for a period of six months or less the original registration fees above mentioned shall be halved." (The State Health officer is authorized to reduce these fees provided they produce more revenue than necessary for the enforcement of the Act.)

#### Texas Act Regulating the Sale and Use of 2,4-D and Other Hormone Type Herbicides

Provides for the licensing of dealers therein and the licensing and bonding of users thereof. License for \$25.00, and for each piece of equipment licensed hereunder a similar fee shall be paid to cover the expense of inspection and is-suance of license." Renewable annually. All persons who "own, operate or control any type of equipment for the purpose of applying 2,4-D, or other hormone type herbicides (except those especially exempt), shall post a bond with the Commissioner of Agriculture in the amount of \$2000.00 for the first piece of licensed equipment and \$1000.00 for each additional separate unit of distributing equipment operated under a license." Exemption: Hand manipulated distributing equipment which is carried and operated solely by man power and "is capable of being carried and used by one man, and

is limited to single discharge sprayers or dusters with a maximum tank or container capacity of 700 cubic inches," and "the bona fide sale or use of 2,4-D or other hormone type herbicides on and for lawns and home gardens in containers of a capacity not larger than one quart liquid measure or two pounds dry measure." (Certain Counties of the State are exempt from the provisions of the Act.)

#### Utah, Economic Poisons Act

(New law. Effective July 1, 1951.) Registration annually. Fee \$5.00 for each product, or any number of brands for \$50.00

#### Vermont\*. Insecticide, Fungicide and Rodenticide Act of 1947

Registration; annually, effective "during the year beginning with the date of application." Fee \$5.00 for each product, or any number of products on payment of annual fee aggregating \$50.00.

#### Virginia\*, Insecticide, Fungicide and Rodenticide Law

Registration annually. Year January 1—December 31. Fee \$10.00 for each brand, or any number of brands on payment of annual fees aggregating \$200.00.

#### Washington\*. Economic Poisons Act

Registration annually. Year January 1—December 1. Fee \$10.00 for the first and \$5.00 for each additional product. Provided if re-registration is not obtained within one calendar month after the expiration, a penalty of 10% is added to the fee, and an additional penalty of 5% of the original amount due, for each succeeding calendar month, but the penalty shall not exceed 50% of the original amount due, provided there is no penalty if registrant makes an affidavit that no business was done during the period of non-registration.

#### West Virginia\*

Bill pending before the present Legislature, which provides for annual registration.

#### Wyoming\*. Economic Poisons Law

Registration annually. Year July 1—June 30. Fee \$2.00 for each product registered, provided "that a maximum registration fee of not more than \$25.00 be charged for any one firm.

#### Canada\*, Pest Control Products Act

Registration annually. Year January 1 — December 31. Fee \$20.00 for each brand, and \$5.00 for each renewal registration.

In addition to this legislation, the industry is also subject to laws administered by the Federal Trade Commission: regulations of the Interstate Commerce Commission, and various city ordinances. Further legislation is now pending in several of the State Legislatures, and a Bill has recently been introduced in the U.S. Congress (H.R. 3257) to amend the

(Turn to page 105)

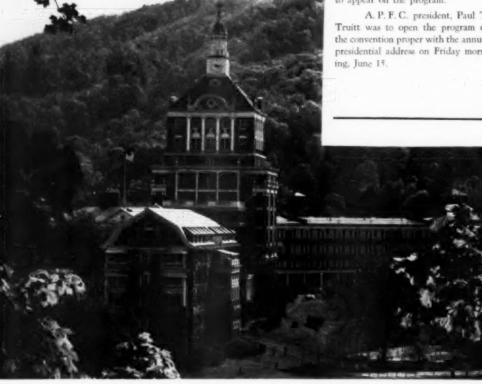
# American Plant Food Council

All set for sixth annual meeting at Homestead, June 14-17, inclusive

LANS for the sixth annual convention of the American Plant Food Council were complete at press time, and the industry group was awaiting the opening of the meeting on June 14, at the Homestead Hotel, Hot Springs, Va. The meeting lasts through June 17.

Members of Congress, government agricultural officials, soil scientists, representatives of the farm press and radio and spokesmen for county agents and vocational teachers were to appear on the program.

A. P. F. C. president, Paul T. Truitt was to open the program of the convention proper with the annual presidential address on Friday morn-



United States Senator Allen J. Ellender (D-La.) Chairman of the Senate Committee on Agriculture and Forestry, will be the second speaker on the opening day. His subject will be "Agriculture . . . Our First Line of Defense."

Dr. H. T. Myers, head of the agronomy department, Kansas State College at Manhattan, will be the final speaker on the opening day. His subject will be "Fertilizer Use in Relation to Animal Nutrition."

#### Brannan Appears June 16

S ECRETARY of Agriculture Charles F. Brannan will be the first speaker at the second session of the convention Saturday morning June 16 on the subject of "Farming in a Defense Economy."

Another high-light of the convention will be an agricultural forum Saturday morning on the subject of "Fertilizer's Contribution to Better Living." The speakers are expected to include: Dr. Paul D. Sanders, Editor, The Southern Planter, Richmond Va., - Moderator; Ferdie Deering, president, American Agricultural Editors Association; Dr. R. Frank Poole, president, Association of Land-Grant Colleges and Universities; Phil Alampi, president, National Association of Radio Farm Directors; Edwin

Bay, president, National Association County Agricultural Agents; and Robert A. Wall, vice-president, National Vocational Agricultural Teachers Association.

A brief business session at which eight new members of the Board of Directors will be elected, is scheduled for Saturday morning at 11:45 A.M.

#### Judd Banquet Speaker

REPRESENTATIVE Walter H. Judd (R-Minn.), was to be the banquet speaker Saturday evening, June 16. His subject is: "Danger Signs in Our Domestic Economy."

A meeting of the Board of Directors of the Council was scheduled for June 17 at which time the Executive Committee and Committee Chairmen will be elected.

Approximately 500 Council members and their guests are expected to establish a new convention attendance record, a Council spokesman said.

W. T. Wright, vice-president, F. S. Royster Guano Company, Norfolk, is chairman of the 1951 Convention Committee and other members are: John V. Collis, president, Federal Chemical Company, Inc., Louisville; J. A. Howell, president, Virginia-Carolina Chemical Corp., Richmond; A. F. Reed, vice-president, Lion Oil Company, El Dorado, Ark; and Paul Speer, vice-president, United States Potash Company, New York City.



PAUL T. TRUITT, APFC Pres.



SECRETARY BRANNAN

In the Photos:

Left: The Homestead Hotel, scene of the sixth annual APFC meeting.

Above (R): Paul T. Truitt . . . makes debut as Council president.

Right center: Secretary of Agriculture Brannan appears June 16.

Lower (L to R): Ferdie Deering and Phil Alampi, members of panel on Saturday morning's program.





PHIL ALAMPI



# Basic Herbicidal Studies With Derivatives of TCA

by
Keith C. Barrons\*
and
Richard W. Hummer

Midland, Michigan

OR the past four years agricultural chemical research workers of The Dow Chemical Company have been conducting field and laboratory experiments on the herbicidal properties of TCA (trichloroacetic acid) and its derivatives. Some of these results have been published from time to time in Down To Earth (1) (3) and in the Research Reports of the North Central Weed Control Conference. (4) (12). Together with the results of experiment station tests, this work has formed the basis of label recommendations for the use of sodium

Aside from empirical field plot tests with TCA, some of the studies have dealt with fundamental problems of plant physiology. A few basic concepts have been developed from this work some of which are well supported by experimental data. The results of these investigations are presented here with the hope that they will stimulate discussion and further research. Critical review and comment is invited.

#### Pyridine Test Method

In the presence of alkaline agents or even in water solution, TCA can undergo the following reaction:
Cl₂CCOOH→CHCL₂+CO₂

The sodium salt in water solution breaks down similarly to yield chloroform and sodium carbonate. This may be a lead for those interested in the mechanism of the toxic action of sodium TCA. From the practical angle, it calls for a word of caution against the use of old TCA salt solutions without first checking for possible decomposition.

A review of colorimetric tests for chloroform (5) (11) led to a test which can be adapted to quantitative determinations of TCA. An aliquot of the solution to be tested is treated with tenfold quantities of 30% sodium hydroxide solution and pyridine. The mixture is heated on a vigorously boiling water bath for five minutes. A magenta color develops in the pyridine layer in the presence of TCA. Figure 1 gives a calibration curve for the range of 10 to 100 micrograms of TCA. Beer's law is obeyed quite well over this range. The curve was obtained using an Aminco Model F Photometer with the 510 mu filter. By using a longer light path (4 inch colorimeter tubes) the range can be extended down to 1 microgram of TCA. The following materials are required for the test:

Sodium Hydroxide solution, 30% by weight.

Pyridine, reagent grade or redistilled. TCA standard solution: One gram of U.S.P. trichloroacetic acid is accurately weighed, dissolved in distilled water and made up to 100 ml. in a volumetric flask. Standard contains 10 mg. (10,-000 micrograms) per ml.

The following procedure was found satisfactory:

Prepare a standard curve by making quantitative dilutions of the

TCA standard solution to give a range of concentrations covering the region to be investigated. For example, dilutions containing 2, 4, 6, 8, and 10 micrograms might be used for the 2 to 10 microgram range or 10, 20, 40 etc. for the 10 to 100 microgram range. Prepare a series of large test tubes (25 x 200 mm.) with 10 ml. of 30% NaOH solution and 15 ml. of pyridine in each. Into each tube measure acurately 1 ml. of a standard dilution. Swirl the tubes gently to promote mixing and immerse to just above the liquid level in a vigorously boiling water bath for five minutes. Remove the tubes and allow to cool slightly. Decant the pyridine layer into a colorimeter tube to determine the transmiss on with a suitable colorimeter. With the Aminco Model F Photometer the 510 mu filter gives the most sensitive determination. Plot the values obtained on semilogarithmic paper to obtain a standard curve.

Unknown solutions to be tested are adjusted to volume so that 1 ml. contains an amount of TCA within the range of the standard curve. The determination is then carried through exactly as in the standard curve, substituting 1 ml. of the unknown for 1 ml. of diluted standard solution. A blank on the reagents should be prepared in similar fashion using 1 ml. of distilled water in place of the standard solution.

For qualitative detection of TCA in soil extracts approximately

\*Paper presented at 1951 meeting of Southern Weel Control Conference, I ml. of soil extract may be added to the reagents as above. Rough quantitative results can be obtained similarly by preparing a known series for visual comparison. The colors are stable for a period of several hours.

It is important to limit the amount of water added to the reactants especially when amounts of TCA less than 10 micrograms are to be determined. Use of 2 ml. or more of test solution causes turbidity in the pyridine layer which makes accurate color matching or adsorption determinations difficult. Soil extracts seem especially prone to cause turbidity. Adequate centrifuging of the soil extracts seems to decrease this interference. In our experiments, greater sensitivity was obtained by adding the sample to the reagent mixture rather than the reverse. Because of the extreme sensitivity of this test, it is essential to run blanks on all reagents including the distilled water since appreciable color may be obtained. This has happened with one batch of pyridine in this laboratory.

Crystalline TCA is extremely hygroscopic. Weighings in preparing the standard solution should be done rapidly and the stock supply of U. S. P. acid should be guarded against contamination from atmospheric moisture. For practical field testing there would seem to be no objection to preparing the standard from technical sodium TCA such as was actually applied in the field treatments. In the latter case it would be advisable to filter the sodium TCA solution before diluting to volume.

This test is not specific for trichloroacetic acid but seems to depend on the presence of trichloromethyl groups. For example, chloroform and chloral give similar colors with these reagents.

#### **Biological Test Methods**

ORN and soybeans have been used by several workers in qualitative tests for the presence of TCA in soil. We have found wheat to be highly satisfactory in testing soil in connection with several experiments. All three species indicated quantitative differences by showing greater

morphological responses as the rate per acre increased.

Several species which in other work showed marked response at 5 pounds of sodium TCA per acre were tested further at 1, 2, and 4 pounds per acre. Only rice and soybeans showed response at 1 pound. Wheat, beans, Korean lespedeza, alsike clover, and German millet showed significant morphological effects at 2 pounds. Corn showed significant morphological changes only at 4 pounds per acre. These results indicated that several crops are more sensitive than corn where a biological test is desired.

#### Plant Responses to TCA

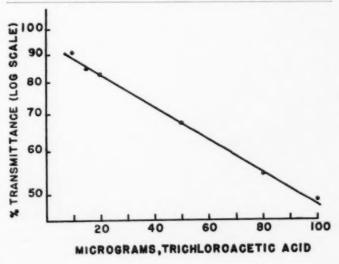
ALTHOUGH TCA has a contact herbicidal effect on plants, this response appears to be physiologically distinct from the systemic response exhibited by the TCA susceptible species. The results of several tests support this view.

 Quack and Kentucky blue grass plots sprayed with sodium TCA solution and immediately washed off with water showed no quick top burn or contact effect as did companion plots similarly sprayed but not washed off. After three weeks the grass in both plots exhibited typical systemic responses to the same degree. When foliage of potted quack grass was dipped in a sodium TCA solution there was a contact herbicidal effect. Subsequent watering was done in such a way as to avoid washing the toxicant from the foliage to the soil and little if any systemic effect resulted.

3. When peas and kidney beans were dipped in a sodium TCA solution containing a wetting agent, a contact "burn" of the foliage resulted which was similar on the two species. Yet when grown in sodium TCA treated soil, peas were relatively tolerant and beans were very susceptible as indicated by a systemic growth response.

4. The contact effect of sodium TCA on plants was similar to that exhibited by other chemicals which have no systemic effect. For example, grass sprayed with equimolar concentrations of sodium dichloroacetate and sodium trichloroacetate showed an identical form and degree of contact response. Within a few weeks, vigorous regrowth had completely obliterated the results of spraying with sodium dichloroacetate while the sodium trichloroacetate while the sodium trichloroacetate plots showed the anticipated degree of grass kill.

The nature of the systemic effect of TCA on plants has been observed to be quite varied. Buds of many perennial grasses exhibited a



profound dormancy which was followed by death or recovery depending on various factors. When quack grass rhizomes showing what appeared to be dormant but viable buds were removed from sodium TCA treated soil and planted in untreated soil, buds tended to grow rather soon. A continued exposure to TCA appeared to be essential for continued dormancy and probably for subsequent death.

Annual grasses including the cereals usually emerged when planted in soil containing TCA, however growth beyond the coleoptile stage was prevented by adequate concentrations. When the first leaf did emerge from the coleoptile it was often greatly reduced in length and darker green than the control. With corn some leaf growth beyond the coleoptile stage usually took place, however, the second and subsequent leaves often remained enclosed in the first or primary leaf.

The root growth of corn and bean seedlings was not greatly reduced by concentrations of TCA in the soil which greatly inhibited top growth. As the untreated plants grew, the differences in root size increased; however, roots of treated plants showing marked foliar effects retained a healthy appearance for some time. These observations suggest the possibility that in susceptible plants TCA inhibits the synthesis of an essential substance which is present in the seed in sufficient quantities to provide for early growth, particularly of roots.

Seedlings of non-grasses exhibited varying responses to the presence in the soil of TCA. Some, as will be listed subsequently, showed little response at rates that were lethal to grasses. Other species were reduced in growth. Alfalfa and the clovers exhibited a peculiar tendency for the leaflets to remain folded and somewhat twisted. Leaves of kidney beans and soybeans exhibited characteristic necrotic lesions and chlorosis even at very low rates. Korean lespedeza produced no shoot growth beyond the cotyledons at rates above two pounds per acre. With flax, high

concentrations induced a temporary crinkling of the leaves with some tip necrosis. Similar temporary leaf crinkling was observed with sugar beets at high rates. The cucurbits showed no effect through the cotyledon stage at rates up to twenty pounds per acre. Subsequent leaves exhibited chlorosis at medium rates and necrosis frequently developed beginning at the leaf tip.

Several woody plant species on which observations were made showed leaf chlorosis similar to that caused by a deficiency of certain minerals ie. a yellowing between the veins with the veins themselves remaining green. Die-back of woody growth often occurred on certain species.

- These miscellaneous observations do not present a clear picture of the nature of the systemic effect of TCA. Rather, they serve to emphasize the deficiencies in our knowledge. Certainly research on the subject by plant physiologists is needed.

#### TCA's Mode of Entry

THE experiments referred to above, involving application to grass with and without subsequent washing, showed that entry through underground parts is important. The tests involving foliage treatment with no application to the soil showed that with quack grass, foliage is at most a relatively unimportant avenue of entry as far as the systemic effect is concerned. In further experiments involving applications to up-turned

quack grass sod, better kill was obtained than when the foliage was sprayed (1) (4) thus indicating further that the important avenue of entry is the roots rather than the tops. Plowing just prior to the application of sodium TCA has now been established as a very efficient method of using this chemical for quack grass control (6) (8) (12).

Reports from several sources indicated that with Johnson grass, foliar absorption and transport to rhizomes may take place. To elucidate this question, two sets of experiments were conducted on possible foliar absorbtion and translocation. Johnson grass growing in large pots in the early heading stage was dipped in a sodium TCA solution and the pots kept on their sides except when watering in order to eliminate the possibility of the chemical dropping or being washed from the leaves to the soil. Following the first test which was set up during the summer there were indications of a slight effect of TCA on underground buds and on the vigor of subsequent regrowth. When the test was repeated during the fall there were no indications of translocation of TCA within the Johnson grass foliage. These tests indicate that foliar transport is probably unimportant as a practical avenue of entry for a systemic effect. It is interesting to note however that the one indication of internal transport came during the summer when some moisture stress occurred in spite

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Table 1

Number of Grass Shoots Arising From Flats Planted to Rhizomes Given Different Pre-treatments and Planted in Soil Containing Varying Amounts of TCA.

Treatment and Rate	No. Shoots as		
	Percent of Control		
Grass from undisturbed sod			
Control	100%		
10 lbs sodium TCA/acre	96%		
40 lbs sodium TCA/acre	61%		
Grass from disked sod			
Control	100%		
10 lbs sodium TCA/acre	42%		
40 lbs sodium TCA/acre	37%		

# Toxicity Hazards

Stanley F. Bailey and Leslie M. Smith\*

Part II

Fire Hazard

IRE hazard in agricultural chemicals is minimal mercial formulations contain flammable ingredients, especially flammable solvents, however such packages are clearly marked flammable with the usual precautions to keep away from fires. Usually, these materials are diluted with water for application. Once diluted, these products are no longer a fire hazard. One material handled commonly on the farm, which is an exception and does present a real fire hazard, is dusting sulfur. Fires have occurred occasionally in the dust hoppers of ground dusters, and in a few instances in airplanes dusting with sulfur. The cause of these fires is not known accurately, but it is likely that the sulfur cloud is ignited by a backfire of a gasoline engine and that it burns rapidly or explodes, thus igniting the sulfur in the hopper. Some fires on airplanes are believed to have been caused by the sulfur cloud being ignited by the motor of a tractor operating on the ground.

Still another factor contributing to possible fire hazard is the static electricity developed in the dust cloud, as it is blown out of the application equipment.

#### Toxic Residues

TN addition to the usual problem of toxic residues left on edible plant parts, growers may encounter residue problems of other diverse natures. A few examples will indicate the diversity of residue problems. Sulfur dust applied to peaches for the control of silver mite will irritate the eyes of the men employed in thinning. Likewise, balers of alfalfa hay will often refuse to work

with alfalfa which has been dusted with sulfur, because of irritation to the eyes. A crew of men employed in picking pears sprayed previously with parathion became ill, presumably by absorbing parathion through the skin of the hands.

DDT can be used successfully to control Lygus bugs on alfalfa or ladino seed crops and no toxic residue problem is involved. However, if application is made too close to harvest, the straw cannot be used for animal feed. Similarly, residual toxicants used on beans render the straw unfit for forage; toxic residues on beets spoil the feed value of the beet tops. An adequate time interval between pesticide application and crop harvest should be allowed.

One of the important residue problems concerns the poisoning of honey bees. Some chemicals are known to kill bees by contact or by fumigation. Many other agricultural

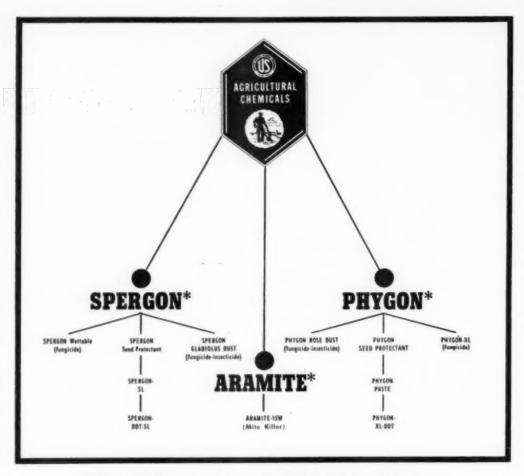
\*Hazards in the application of agricultural chemicals are the topic for an important chapter in the new book, "Handbook of Agricultural Pest Control", by Stanley F. Bailey and Leslie M. Smith, of the Department of Entomology. University of California. This new handbook, designed for use in the field by the custom spray operator, farm advisor, agricultural chemical salesman, and pest control operator, is now available through AGRICULTURAL CHEM-ICALS.

chemicals are practically harmless to bees. These include toxaphene, sulfur, lime-sulfur. Bordeaux, oils, and 2,4-D. DDD and methoxychlor are slightly dangerous to bees; while DDT, nicotine sulfate, dinitro compounds, pyrethrum, rotenone, TEPP, tartar emetic and cryolite are moderately dangerous. Still other chemicals are very dangerous to bees, these include parathion, benzene hexachloride, chlordane, EPN, lead and calcium arsenates, aldrin, dieldrin, copper oxide, and sodium fluosilicate. Of the products listed, dieldrin is particularly harmful because of its long residual effect.

Some compounds, such as tetraethyl pyrophosphate, nicotine sulfate, and pyrethrum are highly toxic to bees, but because of their short duration on sprayed surfaces, or lack of long lasting poisonous residue, are not as destructive to bees as some other chemicals which persist much longer.

A few chemicals are particularly destructive to bees because they are gathered with the pollen, transported to the hive and fed to the young bees, and brood or larvae in sufficient quantity to kill them. In this way, the entire colony may be destroyed. The chief chemicals which present this hazard are calcium arsenate and lead arsenate, and to a lesser extent parathion and copper oxide.

The chief means of avoiding the poisoning of bees consists in not treating plants in bloom. Care should be exercised in this connection; thus an orchard which is not in bloom may have a cover crop which is in bloom and spray applied to the trees will drip onto the cover crop, thereby killing the bees. In arid



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regions, however, another type of bee poisoning may occur, because in such areas, bees may gather dew from sprayed leaves and thus obtain a toxic dose.

In situations where a bee poisoning problem exists, it is well to apply chemicals between seven P.M. and seven A.M. since there will be a minimum of bees flying during this period, and direct contact will be avoided. If the chemical has a short persistence, it may be dissipated largely by the time the bees start to work the flowers. Some plants, such as squash and melons, close their flowers at night so that no spray can get into the nectar. In general, sprays are less damaging to bees than are dusts, and if the desired chemical can be applied as a spray, this method will reduce the chance of killing bees. In some cases, growers may avoid bee poisoning by selecting a chemical which is harmless to bees (see above list) but which will kill the particular pest involved.

The parasites and predators which feed on injurious insects, may inadvertently be killed with chemicals. Many cases are now on record where this has occurred, followed by a severe outbreak of red spiders, scale, or aphids. Most of the reported cases of such an upset of the balance of nature have resulted from the use of a chlorinated hydrocarbon compound. These compounds are relatively nontoxic to red spiders and certain species of scales and aphids, but may be highly toxic to certain of their natural enemies.

Each of these situations is a highly specific one, and no general rule can be given for their solution. Local experience and the advice of the local County Agent should be consulted in problems of this sort.

#### **Drift Hazard**

THE hazards arising from the inadvertent drifting of agricultural chemicals from the field being treated to adjacent fields, are usually one of two types. First, the chemical may drift onto a susceptible crop, and produce plant injury. Second, the chemical may deposit on edible plant parts, rendering them poisonous to man or live stock. In the first instance, weed killers, especially 2,4-D and some of its derivatives are very apt to drift in sufficient quantities to injure adjacent crops. Instances are known wherein these weed killers injured susceptible plants such as grapes, at a distance of a mile or more from the site of application. Insecticides drift occasionally onto susceptible crops and produce injury, but this effect is usually confined to an area within a few hundred feet of the treated field. Thus, calcium arsenate dust which may be applied to tomatoes, may drift into an adjacent field of beans and produce leaf

In the second instance, wherein the chemicals do not injure the plants, but deposit as a poisonous residue, the arsenicals, applied as dusts, have caused the most trouble. DDT also has been involved in this effect. In situations wherein adjacent crops, such as lettuce, alfalfa, or strawberries, would be rendered unmarketable by a toxic deposit, liquid applications should be used rather than dusts, since very little drift hazard results with sprays.

#### Legal Hazards

L AWS governing the manufacture, packaging, transportation, and application of agricultural chemicals are increasing in number and scope. The grower or applicator should familiarize himself with the laws which pertain to him, so that he will not violate these laws and find himself cited for negligence, or find his crop condemned for toxic residue.

Laws pertaining to agricultural chemicals may be Federal, State, County, or City. Those Federal laws which pertain to registration, packaging, labeling as poisons, statement of contents, coloring or discoloring of white, powdered poisons, etc., are embodied in Public Law 104 of the 80th Congress, Chapter 125, an act entitled the "Federal Insectide, Fungicide, and Rodenticide Act". This act was approved June 25, 1947 and re-

pealed and replaced the Insectide Act of 1910.

This act states that it is unlawful to move, in interstate commerce, any economic poison which has not been registered with the Secretary of Agriculture. The registrant must file with the Secretary of Agriculture the name of the economic poison, a complete copy of the labeling accompanying it, and a statement of all claims made for it, including the directions for use. If requested by the Secretary, the registrant must supply a full description of the tests made, and the results upon which the claims are based. If it does not appear to the Secretary that the chemical will do the things claimed, he will notify the registrant to make certain changes in the labeling or in the article so that it will comply with the terms of the act.

The act states further that economic poisons in interstate commerce must carry a label giving the name and address of the manufacturer (registrant); the name, brand, or trade-mark under which it is sold; and the net weight or measure of content. If it is highly toxic to man, the label must carry a skull and crossbones and the word "poison" in large red letters, and a statement of an antidote for the poison. The act sets forth several other provisions too lengthy to come within the scope of this article. This act has numerous interpretations which have been published in the Federal Register. The Secretary of Agriculture is authorized to make rules and regulations for carrying out the provisions of the act, including the collection and examination of samples of economic poisons. The act provides procedures for seizing and confiscating illegal economic poisons, and limits fines and imprisonment for violations of the act.

The Food and Drug Administration of the Federal Security Agency is concerned with many aspects of food, drugs, and cosmetics, particularly their purity and labeling. This Administration is concerned with agricultural chemicals,

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DUVAL POTASH FOR BETTER PRODUCTS

# Bishopp tells Delaney Committee present

# Pesticide Laws are Ample

XISTING legal safeguards, including the Federal Insecticide, Fungicide and Rodenticide Act, the various state pesticide laws, and the FDA's exercise of its function in establishing safe tolerances for insecticides, seem "ample to protect the public from injury by pesticides in foods insofar as it can be done by Federal control", in the opinion of Dr. Fred C. Bishopp, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., who appeared in Washington, May 17th, as a witness before the Delaney Committee, which is investigating the use of chemicals in food products. "The paramount need", said Dr. Bishopp, "is legislation of a uniform type in every state rather than radical changes that will make existing problems more complex".

"New insecticides", Dr. Bishopp reported, "are investigated more carefully today than in the past before a manufacturer is willing to release them to the public and before they will be registered by State and Federal agencies." . . . Actually, many of these materials are no more poisonous than nicotine, arsenicals, and sodium fluoride that have been used as insecticides for years . . . probably fewer accidental deaths from acute poisoning by the new materials occur today than were caused by the older insecticides in the past",

Dr. Bishopp indicated that the new phosphate insecticides such as parathion and hexaethyl tetraphosphate, which leave no residues and thus offer no threat of chronic toxicity hazard, are responsible for most of the serious accidental insecticide poisonings that have occurred within the past few years. The only solution to this problem, he indicated, is education. "The operator must be made to realize that he is using hazardous materials and to read labels and follow directions for use in order to avoid unnecessary risks to himself and the public. These accidents have largely resulted from workers disregarding instructions to use a respirator and protective clothing".

The witness emphasized that the Department of Agriculture has been zealous in protecting the public against toxicity hazards inevitably connected with insecticide use. When DDT traces began appearing in the milk of dairy cows, he recalled, federal and state entomologists immediately recommended that DDT not be used around dairy barns. Reports that DDT was being found stored in the fat of animals likewise led immediately to a recommendation against this insecticide being used on feeds or forage crops that are fed to dairy animals or to stock being finished for slaughter. Similarly, complaints of off-flavors resulting from use of benzene hexachloride on edible products led promptly to a decision by the USDA not to recommend either BHC or lindane for control of insects on edible root crops or any other crop where there would be a likelihood of adverse effects.

Reviewing the important role of

insecticides in protecting the agricultural produce and the health of the Nation, Dr. Bishopp stated "The fact that the people of this country are the best fed in the world, are so well clothed, have such a high degree of freedom from diseases, and are surrounded with so many of the comforts of life is due in considerable measure to the development and general application of methods for controlling insects, and plant and animal diseases."

Losses to various insects the witness estimated at four billion dollars annually. To this must be added an additional loss of two billion dollars annually due to plant diseases. Estimated expenditure for pesticides in 1949 was reported by Dr. Bishopp as \$200,000,000. "This huge expenditure", he observed, "shows, indirectly, the need for control materials for it is certain that growers would not pay this fee, plus additional costs for application, unless they received a fair return for their investment in pest control".

In addition to gains in protection of the country's agricultural output, Dr. Bishopp reminded that the discovery and use of the highly effective new insecticides has also made possible the eradication from large areas of diseases like malaria, yellow fever, dengue, plague, epidemic typhus, and murine typhus. The lives of hundreds of children, he reminded, have been saved by reducing dysentery through fly control by insecticides. And all this has been accomplished, he re-



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Aldrin is available under the brand names of leading insecticide manufacturers. Consult your local dealer and county agent. ported, without a single case of human death proved as due to exposure to DDT used as an insecticide. In this connection he quoted from the Export Committee on Insecticides of the World Health Organization (Technical Report Series No. 4, October, 1950) as follows: "The Committee wished to state that over-whelming evidence showed the harmlessness to man and mammals of DDT as commonly applied for residual spraying and accordingly deplored rumors to the contrary."

"Regarding legal restrictions", Dr. Bishopp indicated in summary, his belief that provisions of the Federal Insecticide, Fungicide, and Rodenticide Act afford an effective means of protecting the grower who uses pesticides and the consumer from residues in food resulting from their use, insofar as this can be accomplished by labeling and registration. Most States also have pesticide laws to protect the public. Officials have formulated a model State insecticide law whose main provisions should be acceptable to all States and, also, fit in harmoniously with existing Federal legislation. In addition, it is the responsibility of the Food and Drug Administration to establish tolerances for pesticides, and, as previously stated, hearings have been held to fix safe residue levels.

"The combination of these safeguards seems ample to protect the public from injury by pesticides in foods insofar as it can be done by Federal control. It does not and cannot replace actual policing of the food supply to detect excessive residues due to misuse of such products. Major needs today are an expanded research program on the toxicology of new pesticides and methods of their analysis to further protect the public; also greater effort to educate the public on the proper use of pesticides, inasmuch as they are absolutely essential for the proper development of our own economy and of our projected program to aid other nations."

ture; one scientist from the Food and Drug Administration; and one from the Public Health Service. The member from the Food and Drug Administration should be chairman of the Commission. The function of this Commission would be to determine policies and to make decisions as to research needed to test a new product, and to draw conclusions on the safe and economically sound use of new chemicals for farm production and marketing, and food processing. It would set tentative and final tolerances.

Mr. Sanders suggested that the following groups be represented:

- (1) A member from the A. M. A.
- (2) A member from the American Veterinary Medical Association.
- (3) A member representing the pesticide manufacturing industries.
- (4) A member from the food processing industries.
- (5) A member representing farm food producing groups — such as vegetable or fruit producers.
- (6) A member representing general agricultural interests such as a representative from the Land Grant Colleges or from general farm organizations.
- (7) A member representing farm marketing groups or interests.
- (8) A member representative of consumer groups or associations.

The National Pesticide Commission would, according to the Sanders proposal, receive applications for study and decision on new products from the chemical and biological industry, should arrange for the necessary research either by a government or non-government agency, call for the judgment of the Advisory Committee, hold formal hearings concerning the safe and economically sound use of product and on the basis of all the previously mentioned functions decide on tolerances that should be permitted to the product or to decide any other appropriate course of action, but with final veto of their decisions resting with the Social Security Administrator. The Commission would, therefore, be a policy forming and administrative commission but not an enforcement agency. Once a decision is rendered by the Commission it would be turned over to the Food and Drug Administration

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#### Sanders Emphasizes Insecticide Need

SANDERS, legislative counsel . for the National Grange, also appeared as a witness at this same session of the committee. He placed great emphasis on the importance of insecticides to the farmer, observing "either we control the bugs and blights-or like other nations in history-we shall go hungry." Insecticides often mean the difference between profit and loss in the farmer's operations, he testified. "A decision by the Food and Drug Administration that withheld sound use of insecticides and fungicides for an area," he warned, "when considered in the light of small margins of profit, could completely destroy the enterprise and drive it out of existence."

Commenting on the necessity for the farmer to shift rapidly from one control material to another, and to have a wide choice of control materials available, he said, "Farmers must be allowed to adopt and use these new compounds readily . . . an unjustifiable restriction or delay in the use of a needed fungicide or insecticide may do irreparable damage to farmers and consumers of farm products . . . The greatest possible opportunity to use these new products must be open to farmers — limited only to non-impairment of the health of our people."

Of fertilizers, Mr. Sanders observed "it does not appear to the Grange either on the basis of our own observations or upon general inspection of the record of this hearing that there is need for new legislation in the field of use of fertilizers." He did suggest the possible necessity of new legislation covering use of pesticides however. His specific suggestions had as their major theme the formation of a three-man National Pesticide Commission, to be assisted by a Food Industry Advisory Committee, which Mr. Sanders suggested might consist of eight representatives of various interested groups.

Ex-officio members of the National Pesticide Commission, according to Mr. Sanders' proposal would be "one top-ranking Physical Scientist from the Agricultural Research Administration of the Department of Agricul-

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# Washington Report

HE Defense Production Administration, parent body for the National Production Authority, has recently announced formal establishment of a Requirements Committee which is to be responsible for reviewing overall demands for critical materials and for recommending policies and programs for balancing supply with demand. This type of organization is similar to the one which was in effect during World War II. Previously, this type of committee had been operating informally through inter-agency meetings but this formal establishment makes the plan the same as that which operated from 1943 to 1945. The following groups will be represented on the committee which will make the decisions for the overall allocation and production of material: Civilian Requirements, Construction Requirements, Economic Stabilization, Food and Agriculture, Foreign Requirements, Industrial Manpower, Industrial Production, Military Requirements, Mines and Mining, Petroleum and Natural Gas, Public Utilities, and Transportation. The committee will have the function of assisting in determining the policies and programs to be adopted by DPA to assure the effective use of vital resources in short supply, and will also review overall and demand supply problems and make recommendations to prevent production bottlenecks that would disrupt the balance between supply and demand.

In turn, the Requirements Committee will be assisted by a Program Adjustment Committee which will have the function of reviewing decisions made by the Requirements Committee. The chairman of the Requirements Committee will make such determinations as he deems necessary and appropriate relative to:

- The requirements for such resources as may be needed for the defense program and industrial mobilization.
- b) The supplies of such resources

- and the amount by which supplies should be increased.
- c) Programs for the direction of resources to various ultimate producers.
- d) Policies related to the allotment of such resources including necessary coordination of related or competing programs.
- e) Such other matters as the DPA may assign the Requirements Committee for consideration.

A typical example will clarify the method in which this program is to operate: Suppose, for example, it is decided that there is an insufficient quantity of DDT available for meeting urgent military requirements and essential civilian requirements. The Requirements Committee will review this entire problem with the respective claimant agencies listed above. If it is found not possible to increase production of DDT, it will then become necessary to allocate the amount of DDT between the various claimants. However, if it is found that an expansion is necessary, then it becomes the responsibility for the Requirements Committee to make such recommendation and to provide the necessary construction materials, raw materials, manpower and other needed items to bring about this increase,

Recent amendments to Chemicals Order M32 provided for a lowering in the DO set aside for DDT. In addition, it is now required that DDT producers have a lead time of 15 days prior to the first day of the month from the month in which delivery is to be expected. Previously, no lead time had been required on DDT orders. The same amendment to M-32 effective on May 1st, also set up a lead time for carbon tetrachloride of 15 days for the producer and 20 days for the distributor as well as lead time for methylene chloride, and Freon 11, 12 and 22.

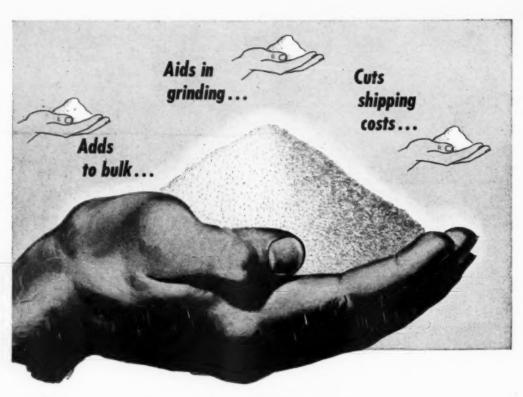
NPA was recently reorganized to provide for setting up of a Chemical. Rubber and Forest Product Bureau which includes the Chemical Division. the Lumber & Lumber Products Division: Pulp. Paper & Paper Board Division. Printing & Publishing Division. Containers & Packaging Division, and Rubber Division. Thus, the Chemicals Division of NPA will actually become part of this Bureau.

There were two new additional industry advisory committees formed which are connected with the peaticide field. One, the aerosol group, includes the packagers and distributors of low pressure and high pressure aerosol bombs. The other is the household industry and dairy insecticide group. Both of these new groups had their initial meetings during the latter part of May and are concerned primarily with the supply of containers and needed raw material required in the manufacture of their products. The supply position with regard to pyrethrum, DDT, Freon and containers was reviewed quite thoroughly at these meetings, also.

Government agencies responsible for assuring an adequate supply of insecticides for the coming season warned against premature optimism over the availability of a sufficient amount of material, and warned that heavy infestations could prevent adequate distribution and supply. Carbon tetrachloride was singled out, among other materials, as being in an extremely tight position and one which may cause wide dislocation in control programs. Carbon tetrachloride is used as a carrier for the production of grain fumigants. The use of the chemical for this purpose has increased substantially in recent years, with some 3 million gals, required for the coming season. A tight supply has resulted from the general shortage of chlorine and carbon bisulphide which are used in making carbon tetrachloride.

At the same time the Department of Agriculture is preparing to issue the area and local infestation reports that have been so helpful to the industry in the past. As much notice as possible of insect infestations will be given so that producers and distributors in the various areas can make materials available as they are needed.

How great will be the infestation of insects in the cotton crop during the coming season, remains uncertain. Generally speaking, however, the cotton



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planting season and the initial growing stages are from 2 to 5 weeks behind the normal average time of development. The average temperatures are somewhat low and crops developed slowly in most areas. In some of the deep southern areas there were several light frosts in the early part of May which also retarded the normal growth of cotton.

The demand for cotton insecticides which was unusually brisk throughout the winter and the early part of the spring, had slackened somewhat during May. This letup in the buying of the cotton poisons may have been expected since many dealers and growers realized rather suddenly, that cotton poisons were available. possible imminence of the effects of CPR 22 and the possibility that there would be a rollback of these prices may also have contributed to the slackening demand. Generally speaking, throughout the cotton area. DDT and BHC containing materials are available, but toxaphene remains in critically short supply. Aldrin and dieldrin, as well as some of the miticidal preparations, were also in brisk demand. Moreover, cotton poisons containing sulphur were characterized by their general lack.

Many State and Federal agencies were continuing to drive home the point that sulphur is in short supply and all efforts at conservation should be practiced to the fullest degree. It was pointed out that sulfur is used in cotton dusts to prevent the development of damaging infestations of red spider mites. In most instances, use of sulfur has been a cheap and effective insurance against losses from this pest. However, these agencies also reminded that the amount of sulfur contained in 3-5-40, 20-40, and similar preparations, although it is an effective preventive when applied at the recommended rates of 10 to 20 lbs. per acre, is not sufficient to suppress a heavy infestation.

Just as the Washington grapevine predicted, the May 28th date when CRP 22 was to become effective, was postponed to July 2. On this date, prices are to be rolled back to pre-Korean levels. The paper work which manufacturers must do to justify increases in their ceilings is recognized to be a tremendous task, and one which simply could not have been completed by the original date.

And if the price control picture is not sufficiently complex already, we have assurances it will get more so. An order covering wholesale and retail prices,—similar in scope to CPR 22 governing manufacturers—is reported now in preparation. It looks like a field day for the accountants of the country,—lawyers too.

Is the government holding the wage line? They have been trying, of course. but the battle is a discouraging one. Packing house employees have just cracked the line with a nine cent wage advance, and this will open the door for other wage increases. Then what happens to price controls on industry? It takes an actuary or a professor of mathematics to figure out the necessary calculations under CPR 22 to get relief.

The board of Directors of the National Agricultural Chemicals Association met in Buffalo, May 23rd.

The Fertiliner Industry Advisory Committee is scheduled for a meeting in mid-June. Probable date is June 18th,—and the place, Washington. Consideration had originally been given to the idea of holding the meeting in Hot Springs or White Sulphur, between the meetings of the two fertilizer associations, but the idea was understood to have been abandoned for fear of setting a precedent which the government might find it inconvenient to continue with other industry advisory groups.

The fertilizer supply outlook will be a logical topic for discussion.—also the sulfur and surfuric acid shortage and how it may affect supplies of fertilizers in the months ahead.

Lou Markwood is reported to be leaving his post at NPA to assume new responsibilities in the Chemicals Division at OIT. Phil Groggins will move over from agriculture to head the new Agricultural Chemicals Division of NPA. Melvin Goldberg is serving as special consultant to W. R. Alstetter, Production and Marketing Administration, U.S.D.A. Thus, with the exception of John Rodda, now with U.S.I., this is about the same personnel who handled insecticides and insecticide raw materials so efficiently at WPB during the last war.

On and on goes the list of witnesses at the Delancy hearings. Dr. F. C. Bishopp was unable to complete his testimony at the May 17 session, and was scheduled to return on May 22, along with Dr. John R. Magness, of the U.S.D.A. Bureau of Plant Industry, Soils and Agricultural Engineering. Dr. E. L. Griffin, Production and Marketing Administration, U.S. D.A., was to appear on May 24 with Dr. Theodore C. Byerly, Bureau of Animal Industry, U.S.D.A. The committee may reach John Conner, special counsel for NACA, sometime in June.

In the corridors outside the hearing room at the May 17th session, some wag, obviously from the insecticide industry, observed that the Delaney committee should try just once to register a new label for an insecticide if they think there aren't enough regulations governing insecticide manufacturers.

The committee's recommendations could of course be for some solution other than new legislation. They seemed to take quite an active interest in J. T. Sanders' (National Grange counsel) proposal for a National Pesticide Commission, with a Food Industry Advisory Committee to assist. These seem to be the two standard congressional answers to any problem,-either pass a new law, or appoint a new commission. The less glamorous approach seldom attracts much attention. Dr. F. C. Bishopp of the U.S.D.A., for example, suggested that the path toward safer use of insecticides could best be approached through education of the user and diligent enforcement of existing control measures. Pound away at the user to read labels and follow directions! Warn him that most all insecticides are necessarily dangerous! Keep everlastingly at the job of checking residues on crops to make sure that they do not exceed safe tolerance! No, these jobs are not very dramatic, they lack the flourish of passing a new law or appointing a new commission,-but we hazard the belief they offer a better prospect of getting the job done!

Louis Bromfield, well-known author and operator of Malabar Farm, appeared before the committee on May 11. He cited the fact that polio and Virus X have come to prominence since we started widespread use of DDT and other new chlorinated insecticides, and apparently feels that there may be some cause and effect relationship here. But in the absence of any actual evidence, which has not been presented either by Mr. Bromfield or others, there are few who will place much credence in this theme. Might as well blame polio and flu on the atomic bomb, the "new look" or television. They also came in about the time DDT did.

Mr. Bromfield repeated for the benefit of the committee his thesis that adequately fertilized plants are comparatively immume to insect attack. It would be fine if this were generally true, but other observers have found that it just doesn't work out this way. The bugs eat up the healthy, well-fertilized plants as fast as they consume their undernourished brothers.—as J. T. Sanders of the National Grange, told the committee members at his appearance a few days later.



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## The Listening Post

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

# 1

#### By Paul R. Miller

N. Sasser, J. Feldmesser, and G. Fassuliotis, of the U.S. Bureau of Plant Industry, Soils, and Agricultural Engineering, state that "Systox" spray (Supplied by Geary Chemical Corporation, New York; hereafter referred to as "E-1059"). an organic phosphate insecticide developed by Gerhard Schrader of Farbenfabriken Bayer, Leverkusen, Germany, has been reported to penetrate plants by absorption, entering into seeds, roots or leaves and killing aphids, mites and some types of chewing insects. In view of this report preliminary tests with "E-1059" were undertaken to determine its effectiveness in controlling the golden nematode of potatoes, Heterodera rostochiensis, and root-knot nematodes (Meloidogyne sp.).

"Systox" spray is a brown viscous material containing 32.1% active ingredient with 67.9% emulsifier "8139" (active ingredient 3 lbs. per gallon). In the following experiments, all dilutions were made with water and concentrations used were based on percentage active ingredient.

E-1059 vs Nematode Cysts

NE gram samples of moist golden nematode cyst dormant stage material (approximately 1500 cysts) were submerged in petri dishes containing "E-1059" in concentrations of 0.25, 0.5, 1, and 2% for periods of one day and of one week, to determine the ability of "E-1059" to penetrate the cysts, either through the wall or natural openings, and to affect larvae. After the treatment periods the cysts were washel thoroughly until no odor of the chemical could be detected. The treated

cysts and similar lots of untreated cysts of the same origin were then placed in clean petri dishes and allowed to dry for two days, after which 25 cc of fresh potato leachings (collected by allowing water to seep through the soil of a vigorously growing potted potato plant) were added to stimulate hatching. The dishes were kept in the laboratory at room temperature. Daily examinations of the dishes were made with the aid of a binocular dissecting microscope and all hatched larvae removed and recorded. Results of this experiment are shown in Tables 1 and 2. The inhibition period indicated in the tables refers to the period between the adding of potato leachings and the appearance of the first larvae.

Several investigators have found that exposure of cysts to various chemicals and treatments will inhibit larval hatchings.

In these experiments, the inhibition period for cysts submerged in "E-1059" for one day, ranged from ten days for the lowest concentration. Cysts treated for one week showed longer periods of inhibition. and the total number of larvae hatching after a one-week treatment was less than the total number hatched from the cysts treated for one day. This was true for all concentrations. When the experiment was terminated, cysts examined from all concentrations contained moving larvae, therefore, it is assumed that exposure to "E-1059" disrupted, in some way, the stimulatory effect of potato root leachings to the larvae, or the response of the larvae to the stimulation.

A small experiment was then de-

signed to find a concentration and period of treatment at which "E-1059" would be lethal to larvae in cysts. Cysts submerged in concentrations of 2, 2.5, 3, 3.5 and 4% for periods of one day up to seven days were washed thoroughly and placed in petri dishes with 25 cc of potato leachings. After 30 days, cysts from all concentrations were opened and found to co.tain moving larvae. No larvae hatched during this period.

Other workers have found that ferric oxide added to potato root leachings delayed hatching. In an effort to test the effect of "E-1059" when added to leachings, an experiment was set up in which cysts were submerged in a mixture of equal parts of a .006% concentration of "E-1059" and potato root leachings. Larval hatching was inhibited for ten days at which time the experiment was terminated. Hatching occurred in the untreated checks within 24 hours.

Treating Nematode Larvae

N EWLY hatched larvae of the golden nematode were exposed to "E-1059" in petri dishes at concentrations of 0.25, 0.5, 1, and 2% for periods of one day and of one week to determine whether or not the compound was capable of killing the larvae. After the exposure period the "E-1059" solution was siphoned off and replaced with tap water. Three weeks later, counts were made with the aid of a binocular dissecting microscope and the number of dead and living larvae recorded. Table 3 shows the results of this experiment.

A low percentage of the larvae were killed when in direct contact with the material for one day, except at the highest concentration. The percentage kill for larvae exposed to the chemical for one week, however, was high for all concentrations.

Larvae appeared to be stunned or paralyzed when placed in the various concentrations of "E-1059", but seemed to overcome this effect at the lower concentrations when the chemical was replaced with tap water. At the higher concentrations, "E-1059" had a more definite injurious effect on the larvae, appearing under the microscope as constrictions in the gut wall.

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For further information write to Aluminum Company of America, Chemicals Division, 641 Gulf Bldg., Pittsburgh 19, Pennsylvania. The disappearance of the line of demarcation between gut wall and outer cuticle was also evident. These malformations appeared after one or two days exposure to the material.

Hurst and Triffitt (1935) showed that a 2.5% solution of ferric chloride paralyzed hatched larvae in a few hours. Ferrous sulfate in strong solutions was lethal to these larvae but worked less rapidly. Smedley (1939) in testing larvae against the isothiocyanates, found that .02% ethyl isothiocyanate killed the larvae in two and one-half hours.

The fact that concentration of 0.25% and 0.5% for one day killed only 6.25 percent of the larvae treated, while the same concentrations for one week killed 94.5 percent and 98.75 percent respectively, would indicate that the "E-1059" is absorbed

gradually and that death of the larvae is not sudden.

#### Treatment of Potato Seed

POTATO seed pieces of approximately the same size and with only one cut surface which had been allowed to heal over were soaked in solutions of "E-1059" at concentrations of .01, .03, 0.1, 0.25, 0.5, 1, and 2% for periods of one hour, two hours, and four hours. The seed pieces were than allowed to dry prior to planting in infested soil. Four-inch pots were used and each treatment was replicated three times. The plants were allowed to grow for a period of six weeks.

The soaking of potato seed pieces in solutions of "E-1059" resulted in very poor germination with only about 60 percent of those planted showing any top growth. Tuber weights taken from plants showing somewhat normal growth, were inversely proportional to the concentrations of "E-1059". The higher the concentration used, the lower the tuber weight.

In order to measure the effectiveness of the treatment, the number of "new" cysts that had developed on the roots of the plant sample, recognizable by their color, was determined as number per gram of root. A reduction in the formation of new cysts was not evident.

#### As a Foliage Spray

THE purpose of this experiment was to determine if concentrations of "E-1059" when sprayed upon the foliage would be absorbed and translocated to the roots in sufficient quantities to be lethal to the larvae of nematodes in the root.

Potato seed pieces were planted in four-inch pots of golden nematode-infested soil. Soon after the shoots emerged, the plants were sprayed once weekly or twice weekly with "E-1059" in concentrations of .006, .01, .05, and 0.1, and 1%. Each treatment was replicated three times. The plants were sprayed for a period of four weeks, using a small atomizer spray. Control receiving no spray were included.

Phytotoxicity was very pronounced at the 1% concentration. Burning, slight curling of the leaf tips, and premature defoliation were the chief symptoms.

Examinations for cysts were made as in the previous experiment. The result of this experiment proved the treatments completely ineffective so far as any effect on the nematodes was concerned. Plants sprayed with all concentrations produced new cysts in numbers and stages of development comparable with those produced on the control.

Treatment as Soil Drench

AN experiment was designed to determine whether or not "E1059" would inhibit hatching and be lethal to larvae in soil as it was in vitro. Four-inch pots of heavily infested soil were drenched with "E-

(Turn to Page 103)

TABLE 1

Hatching of Heterodera restochiensis larvae after exposure of cysts to E-1059 for one day and subsequently to potato leachings for 61 days.

E-1059 concentration (%)	Inhibition period (days)	Total hatched
Check	0	5780
0.25	10	586
0.5	10	275
1.0	33	9
2.0	61	0

TABLE 2
Hatching of Heterodera rostochiensis larvae after exposure of cysts to E-1059 for one week and subsequently to potato leachings for 55 days.

E-1059 concentration (%)	Inhibition period (days)	Total hatched
Check	0	6520
0.25	20	212
0.5	41	17
1.0	37	18
2.0	55	0

TABLE 3

Lethal properties of E-1059 when placed in direct contact with Heterodera rostochiensis larvae.

E-1059 concentration (%)			Effect or	n larvae			
	After	one day e	xposure	After one week exposure			
	Number alive	Number dead	Percent killed	Number	Number	Percent	
Check	800	0	0	800	0	0	
0.25	749	51	6.25	44	756	94.5	
0.50	750	50	6.25	10	790	98.75	
1.0	510	290	36.25	0	800	100	
2.0	0	800	100.0	0	800	100	

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#### **Insect Control Continues On Many Fronts**

This column, reviewing current insect central programs, is a regular feature of AGRICULTURAL CHEMICALS. Dr. Haeussier is in charge of Insect Pest Survey and Information, Agric. Research Adm., B. E. 6 P. Q. U.S.D.A. His observations are based on latest reports from collaborators in the department's country-wide pest surveys.





ONSOLIDATION of all work on the adaptation and utilization of aircraft and other special equipment for agricultural pest control in the Bureau of Entomology and Plant Quarantine was announced on May 16 by the U.S. Department of Agriculture. This consolidation combines work formerly done at a number of the Bureau's different field stations. Kenneth Messenger, a longtime employee of the Bureau, will direct the work from the Bureau's newly established Aircraft and Special Equipment Center at Oklahoma City, Okla. (See Agricultural Chemicals, March, Page 99).

The Center has direct responsibility for the acquisition, assignment, modification, and disposition of aircraft used by the Bureau. It will advise in the development of specifications and contracts for aircraft operations in which the Bureau cooperates. It will assist in the inspection of aircraft and the investigation of the qualification of pilots engaged in these operations. In cooperation with the Civil Aeronautics Administration's Aeronautical Center, also located near Oklahoma City, it will develop operating standards for agricultural pest control aircraft operators throughout the country.

The Aircraft and Special Equipment Center will also assemble and maintain current information on the development and availability of ground-application equipment. It will advise the Bureau and its field stations, State research organizations, and other groups and individuals involved with pest control on machines suitable for their needs. Advice will be given on the modification of special machines where required.

A close association will be maintained with engineers of the U. S. Department of Agriculture, cooperating states and industry to insure prompt solution of engineering problems that arise constantly in connection with improvement of special machines required for pest control work

#### Quarantine Hawaiian Import

CHEAPEK, speedier method of treating a number of perishable commodities prior to their certification for shipment from Hawaii to the U.S. mainland under the domestic fruit and vegetable quarantine, was announced on April 24 by the U.S.D.A. This improved method involves fumigation of the commodities with ethylene dibromide at the rate of one-half pound per 1,000 cubic feet of space. A 2-hour exposure period at 70° F. is required.

Research work on which this treatment is based was performed by J. W. Balock, B.E.P.Q. entomologist in Honolulu. D. L. Lindgren of the U. of California Citrus Experiment Station, Riverside, participated in the screening tests in Hawaii indicating that ethylene dibromide might be useful as a fumigant for eliminating fruit fly infestations. Ernest Akamine, Hawaiian Agricultural Experiment Station physiologist, studied the tolerance of Hawaiian fruits and vegetables to the fumigant.

Treatment is required as a condition for quarantine certification of many Hawaiian fruits and vegetables intended for interstate shipment. This is due to their possible infestation with the Oriental fruit fly, the melon fly, and the Mediterranean fruit fly.

Of 53 compounds tested, ethy-

lene dibromide proved to be the most toxic fumigant to eggs and larve of the Oriental fruit fly. Tests also showed that it is a satisfactory fumigant for the eggs and maggots of the Mediterranean fruit fly and the melon fly.

Tests for fumigant injury to these commodities showed no commercial damage at the ethylene dibromide concentration lethal to fruit flies. Other results of these tests showed that on a weight basis, ethylene dibromide is 17 times as effective as methyl bromide in destroying the immature stages of the Oriental fruit fly in papaya.

Analyses of commodities fumigated with ethylene dibromide show no bromine residue of public health significance.

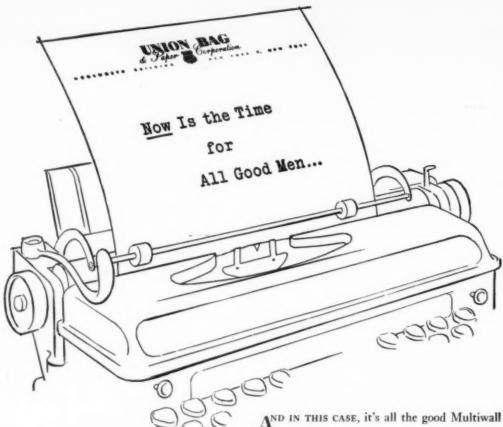
Cooperative experimental work performed in California by research workers of that state has shown that many of their fruits and vegetables are more tolerant to ethylene dibromide fumigation than to any other treatment tested. This would be an important contribution to Oriental fruit fly eradication were this insect to evade the rigid controls now set up to keep it out of the U. S. mainland.

#### Status of Insect Pests

ACCORDING to the Oklahoma Weekly Crop and Weather Bulletin, greenbugs continued to damage wheat and oats in that state during the last half of April. Several factors, such as cool weather, drought, spraying, and natural enemies, seemed to have reduced activity of the pests in some sections. Nevertheless, a very large acreage of wheat was reported abandoned as a result of damage by greenbugs and drought.

Infestations of the Mexican bean beetle have been increasing slowly in the south this spring. By the middle of May the insect was reported to have emerged from hibernation in Delaware and light to moderate infestations were present on beans in in parts of South Carolina, Georgia, and Florida. The bean leaf beetle was numerous on beans at that time

(Turn to Page 101)











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## **Technical Briefs**

#### Fertilizer & Alfalfa Seed

Symptoms of fertilizer deficiency and damage by insects have been observed in many Wisconsin alfalfa fields. In some cases the two were similar. There was difficulty in determining the relative importance of soil fertility, especially a low boron level, and insects in the damage done to alfalfa.

During the period of April 19-26, 1947, top dressings of fertilizer were applied to established stands of alfalfa by means of fertilizer drills or endgate spreaders. The fertilizer treatments and check area were plotted in large single parallel strips. The treatments consisted of an unfertilized strip between two 1-acre plots, one top dressed with 400 pounds of 0-20-20 and the other with 400 pounds of 0-20-20 and 40 pounds of borax.

Crosswise of the soil fertility strips, 5 per cent DDT dust was applied once at about 40 pounds per acre. An undusted area was left for comparison. Dusting was done during a late blossom bud stage of the second crop, but some blossoms were present. Dusting dates for the four fields were August 3, 5, and 9 respectively in the order of their listing in table 1. An airplane applied

the dust to fields numbers 2 and 3 and a hand-operated rotary crank duster was used in numbers 1 and 4.

Soil analyses were made just previous to the fertilizer applications, and the available boron contents of the various soils are given in table 1. Among the more important insects infesting the alfalfa were Lygus oblineatus, (Say), Adelphocoris, lineolatus (Goeze), A. rapidus (Say), and Empoasca fabae (Harr.).

The first crop of alfalfa was harvested for hay and the second crop left for seed. The seed crop was harvested in September by cutting 3-foot wide parallel swaths with a Jari mower. The alfalfa was then dried and threshed in a small huller. Yield data are given in table 1.

The results show that neither insecticide nor boron alone gave maximum yields of alfalfa seed. As regards soil fertility it is necessary that the lime, phosphate, and potassium level as well as the available boron content be high. Even high fertility levels did not produce seed when large numbers of insects were present.

Yields were consistently increased with insecticide alone or with the application of borax but in every case top yields were not obtained unless both the insecticide and boron treatments were made. Seed yields with both treatments were increased from 40 to 77 per cent over the next highest treatment.

"Alfalfa Seed Production as Influenced by Insecticide and Fertilizer Application", by E. H. Fisher and K. C. Berger, in *Journal of Economic Entomology*, Vol. 44, No. 1, February, 1951.

#### Pyrethrum Residue Studied

The effective treatment of cotton flour bags against grain insects by sizing the warp with small quantities of pyrethrum extract required testing of the flour for residues, even though pyrethrins are considered as highly effective insecticides least harmful to warmblooded beings.

Samples of flour from bags 5 and 10 mg, of pyrethrins per square foot were analyzed by the Seil method. No pyrethrins I were found, but small quantities of material reacted in the analysis as pyrethrins II even in the samples from untreated bags. The Seil and A.O.A.C. methods were checked for interference by unsaturated fatty acids, as also occur in pyrethrum extracts as pyrethrolone and cinerolene esters. For comparison raw linseed oil was tested by these methods and found to give positive values even for pyrethrins I in the O.A.O.C. method but only for pyrethrins II in the Seil method. To prevent this interference low pressure hydrogenation with a palladium oxide catalyst was used. In the subsequent analysis the values for pyrethrins II from flour of treated and untreated bags were close to the limit of error in the determinations and amounted to at most 2 p.p.m. of the flour after deduction of the blanks.

In view of the existence of unsaturated fatty acid derivatives in pyrethrum extract, the interference found suggests a careful check on the accuracy of the present commercial analytical methods.

—A. A. Schreiber and D. B. McClellan, McLaughlin Gormley King Co., at 116th annual meeting, Am. Chemical Soc., Boston, April 1951.

Table 1

Alfalfa seed yields in pounds per acre on three soil types with and without DDT insecticide and borax.

Fertilizer Treatment	Yield of Alfalfu Seed in Pounds Per Acre							
	Fayette Silt Loam (Field 1) Dusted With		Superior Clay Loam (field 2) Dusted With		Superior Clay Loam (Field 3) Dusted With		Belfontaine Silt Loam (Field 4) Dusted With	
	None 400 lbs. 0-20-20 400 lbs. 0-20-20	20 36	<10 <10	83 92	<10 13	94 77	<10 <10	120 123
plus 40 lbs. borax	141	25	121	33	120	13	205	22
Available boron in soil before treatment (lbs. per acre)	0.44		1.80		2.00		1.36	
Parts per million boron in untreat- ed first crop hay (whole top of plant)	11			28		22	22	



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#### **Growth Regulators Tested**

A technique for treating tomato plants with growth regulators consists of placing important factors on a quantitive basis with respect to the concentration and quantity of the applied growth regulator, the volume of test solution used, and the location and relative size of the treated area. For a given volume of applied test solution (0.01 to 0.01 ml.), the concentration of 2.4-D, the number of treated leaflets, and the dose of 2,4-D (y per plant) were of increasing importance, in the order named, for increasing the magnitude of the induced responses on tomato.

Evaluation of induced responses consisted of ranking measured responses or of arranging the treated plants in the order of increasing magnitude of any given response, or according to all responses, assigning rank values to each plant, and then analyzing the assigned values statistically by rank methods. Ranked responses in different tests showed good agreement when compared quantitatively by use of reference points on standard dosage-response curves.

The method of rating plants in a continuously increasing order made use of the presence or absence of responses corresponding to all parts of dosage-response curves, including decreasing, zero, and negative values in the high dosage range.

The decreasing order of sentitivity of responses in the range C.04 to 100γ per plant was modification of leaves, curvature of stem, increase in height (stem elongation), temporary declination of treated leaf petiole, induction of roots, swelling and proliferation of stem tissue, permanent declination of leaves, inhibition of growth, and killing.

Other growth regulators (including TIB) used in combination with 2,4-D induced additive and antagonistic effects on tomato, sunflower, snap beans, and zinnia. Combination treatments applied to tomato also induced responses which were qualitatively different, particularly with respect to rooting (NA and 2,4-D, and 2,4-D, and 2,4-D) and disrup-

tion of apical dominance both with and without active terminal growth (maleic hydrazide vs. 2,4-D). The reason why these effects and some of the effects on flowering reported by other workers cannot be considered anti-auxin or auxin antagonistic effects, is discussed.

On the basis of the minimum quantity of 2,4-D required to induce a given response, the efficiency of the present method was about three times greater than the standard lanchin or spray solution methods, and about 20 times more efficient than the soil application method.

—Summary of "A Quantitative Method of Measuring Response of Plants to Growth Regulators" by A. E. Hitchcock and P. W. Zimmerman in Contributions from Boyce Thompson Institute, January-March, 1951, Vol. 16, No. 5.

#### Dithiocarbamates in Foods

A modification of the conventional Dickenson-Viles technique for the analysis of dithiocarbamates in micro quantities was applied to the determination of residues on a variety of treated fruits and vegetables. A sensitivity of approximately 10 micrograms was found for the dithiocarbamates studied during this investigation. Recoveries of 100 per cent of theoretical were obtained with pure zinc and ferric dimethyl dithiocarbamates, and 80 per cent with freshly prepared sodium and zinc ethylene bisdithiocarbamates.

Stripping, scrubbing, and pulping were employed as general sampling techniques during the residue study. Although comparisons among the three techniques showed satisfactory agreement, no precise determination of the efficiency of each was attempted. However, the recovery of ethylene bisdithiocarbamates from celery, tomato, spinach, and cabbage pulps was found to be less than theoretical.

Dithiocarbamate residue analyses were conducted on fresh apples, cherries, green beans, cucumbers, tomatoes, grapes, cranberries, pears, peppers, spinach, squash, canned cherries, and canned spinach. Among the variables investigated were the type of food surface, concentration of treating agent, number or frequency of treatments, elapsed time between final spray or dusting and harvest and analysis, and postharvest treatments such as washing or canning. In the majority of cases, the dithiocarbamate residue level was found to be less than 2 p.p.m.

—"Determination of Dithiocarbamates on Food Crops", by W. K. Lowen, Grasselli Chemicals Dept., E. I. duPont de Nemours & Co., at 116th annual ASC meeting.

#### Space Spraying Studied

Space spraying has been practiced at the Oregon State College dairy barn for five years. Control of the house fly and the horn fly has been quite satisfactory. It has been necessary to space spray stanchioned covers to control these two species.

The stable fly became troublesome for the first time in 1949 and was readily killed but not effectively controlled by space sprays.

There has been no indication of development of insecticide resistant strains in the dairy barn. This is in contrast to conditions in the college hog barn, where DDT resistant flies have developed after the use of residual sprays.

Eleven to 17 space sprays may be necessary for horn fly control under Western Oregon conditions depending on the length of the horn fly season. It was indicated that early treatments aided in preventing later heavy development of horn fly.

Insecticides such as DDT, chlordane and pyrenone have been satisfactory for space sprays. The use of any of these materials is economically feasible. Pyrenone sprays may have some advantage because, according to present information, there is little likelihood of milk contamination through their use.

—Summary of article, "Space Spraying for Fly Control in Dairy Barns", by H. E. Morrison, R. W. Lauderdale, H. H. Crowell and Don C. Mote, Corvallis, Oregon, in December, 1950, Journal of Economic Entomology, Vol. 43, No. 6



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Striped cucumber
beetle
Spotted cucumber
beetle

Lygus compestris Celery leaf tier

ASPARAGUS Common asp

Common asparagus beetle Spotted asparagus beetle

Flea beetle
Colorado potato
beetle
Blister beetle
Fruit worm

POTATOES
Colorado potato
beetle
Blister beetle

Blister beetle Flea beetle Potato leaf hopper BEETS Webworm

Corn ear worm
SPINACH

Leaf tier
BLUEBERRIES
Blueberry fruit fly

ORNAMENTAL PLANTS

Box elder bug

MISCELLANEOUS

Clover seed head caterpillar Strawberry root worm Cherry fruit fly

#### **Fertilizer Combinations**

A summary of results of experiments with different rates and combinations of nitrogen, phosphoric acid and potash upon the total and marketable yields of sweet potatoes indicated that on Bowie fine sandy loam, both nitrogen and phosphoric acid caused significant increases in yield when they were used alone, but potash alone had no such effect. Combinations of nitrogen and phosphoric acid were little more effective than the same rate of either. On Lakeland loamy fine sand, nitrogen alone or phosphoric acid alone doubled the yield, and potash alone tripled the yield. On both soils, maximum yields were obtained only with a complete fertilizer which supplied sufficient quantities of all three fertilizer components. The best amounts of each component differed with the two soils, as did the ratio between the components. On the Bowie fine sandy loam, the best fertilizer was one which supplied 40 pounds of nitrogen and 80 pounds each of phosphoric acid and potash. Lakeland loamy fine sand required more nitrogen and phosphoric acid, the best fertilizer supplying 80 pounds each of nitrogen and potash and 120 pounds of phosphoric acid per acre.

On a Lakeland loamy fine sand, the application of a fertilizer which supplied 80 pounds each of nitrogen and potash and 120 pounds of phosphoric acid increased the total yield from 112 bushels, of which only 47 percent (53 bushels) was marketable, to 399 bushels, of which 77 percent (307 bushels) was marketable.

—Summary of Progress Report #1326, Texas A. & M. College, College Station, Texas. H. C. Hutson and J. C. Smith, authors.

#### Chemotherapeutic Control

The red stele disease of strawberry, caused by Phytophthora fragariae, has been controlled by soil applications of disodium ethylene bisdithiocarbamate (Dithane D-14). There is evidence that the chemical acted therapeutically and not as a soil sterilant, and thus is a new ap-

proach to the control of root diseases. Units of 10 strawberry plants, growing in sand, received five successive applications of each of two concentrations of Dithane D-14, 1.5 and 0.75 per cent, respectively. The plants were then planted in infested untreated soil without further treatment. The higher concentrations gave 100 per cent, and the lower 60 per cent, control. The 1.5 and 0.75 per cent solutions, applied in like manner to plants set directly in infested soil, gave 70 and 100 per cent control respectively. The poorer control of the higher concentration was ascribed to root injury preventing sufficient uptake of chemical for protection. Only 10 per cent of the check plants grown in untreated soil remained healthy. The fact that control was achieved by treating plants grown in sand and subsequently planted in infested untreated soil with no further treatment indicates that the Dithane D-14 was absorbed by these plants and acted therapeutically. In a field trial two subsurface applications of the 1.5 per cent solution completely prevented the spread of the disease from an infested area, at the time of application as well as the following year.

—E. M. Stoddard, Connecticut Agricultural Experiment Station, in Phytopathological Abstracts, January, 1951.

#### Control of Leaf Roller

The fruit tree leaf roller, Archips argyrospila (Walker), infested more than 2,700 acres of navel and Valencia oranges in western San Bernardino and eastern Los Angeles counties during April and May, 1950. Injury consisted primarily of rolling, webbing, and feeding on the shoots of the spring flush of growth. Extensive damage was caused by the larvae feeding on the blossoms, however, and after petal fall, it was observed that the newly set fruit had been eaten into and destroyed in many groves. In two groves considerable damage was done to mature navel oranges on the trees, and a high percentage of navel oranges from one moderately infested grove

was damaged in the packing house where the fruit had been stored for 3 days prior to washing and grading.

Limited observations concerning the egg, larval, pupal, and adult stages of this insect on citrus trees are reported.

DDT used commercially at 6 pounds of a 50 per cent wettable powder in 300 to 500 gallons of water per acre, applied as a spray by speed-sprayer, boom-sprayer, or spray-duster equipment, gave satisfactory control of the larvae. DDT used commercially at 5 pounds also gave satisfactory control when applied with a spray-duster at the rate of 150 gallons per acre and operating with 450 pounds pressure at the nozzles. TDE, parathion, and ethyl paranitrophenyl thionobenzenephosphonate also gave satisfactory control; methoxychlor, aldrin, and dieldrin were less satisfactory; and Ryania was only slightly effective at the concentrations used in these experimental trials. Of the mechanized spray-application equipment employed, the speed sprayer afforded the most uniform tree coverage, followed closely by the boom sprayer and the spray-duster.

—Summary of "Spray Tests on Citrus to Control Fruit Tree Leaf Roller", by E. Lawrence Atkins, Jr., University of Calif. Citrus Exper. Station, Riverside, Journal of Economic Entomology, Vol. 44, No. 1, February, 1951.

#### DuPont Dedicates Lab.

University and industrial scientists from almost every section of the country met at Wilmington, Del. on May 10 to dedicate the \$30,000-000 addition to the Du Pont Company's new experimental station laboratories.

The gathering heard two addresses, one from Dr. James B. Conant, president of Harvard University, the other from the Du Pont Company president, Crawford H. Greenewalt. Dr. Elmer K. Bolton, director of the company's Chemical Department, was toastmaster at the dinner program which brought to a close a day-long dedication program.

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#### Brush Control in Ark.

The Thompson Horticultural Chemicals Corporation of St. Louis, Mo. and Los Angeles, Cal. has leased an 1,800-acre tract in Boone County, Ark. and a similar tract in Taney County, Mo. to experiment with chemical control of brush and sprouts with various combinations of 2,4-D and 2, 4, 5-T.

The firm will spray the two areas by plane with a solution which William T. Thompson, president of the firm, believes to be the indicated means of freeing the Ozark area from brush which is preventing its development and reclamation for cattle raising and farming. Other objectives of the experiment are to provide extensive and profitable pasture areas.

The firm claims successes with similar projects in Texas, Oklahoma, Kansas, Colorado and New Mexico. Thompson's staff traveled over twenty-nine states, covering 100,000 miles, before they selected the Ozarks for their next experiment, he said. They located a 6,000,000 acres area in which brush and sprouts are the greatest single factor in retarding land development, and they found good rainfall and a temperate climate. Much of the land, though thin and rocky, is essentially fertile, and well supplied with lime. Water also has a high lime content, a prime requisite for good grazing. The Ozarks are close to Iowa feed sources and to cattle markets, and permanent pasture grasses flourish under climatic and soil conditions found here, Thompson said.

He also believes the land can be cleared and freed of ticks, bane of the cattle grower's existence, by the addition of a tick killer to 2,4·D or 2,4,5·T sprays. The University of Arkansas and University of Missouri Colleges of Agriculture are cooperating in the project. G. V. Hook, University of Missouri agricultural graduate, is in charge of the project with a staff of 12, and is making his head-quarters at Harrison.

#### Insecticides Help Corn

There has been some question about applying soil insecticides to seed corn for fear it might injure the germination of the corn. Yields of corn from a test by Philip C. Stone, entomologist at the University of Missouri, showed no damage from the application of soil insecticides.

The yields per acre were as follows:

Fertilizer alone—97.6 bu.
Fertilizer+Chlordane—97.6 bu.
Fertilizer+Aldrin—103.5 bu.
Fertilizer+Dieldrin—100.5 bu.
Fertilizer+Heptachlor—100.5 bu.
Fertilizer+Lindane—99.1 bu.
No fertilizer-no insecticide—67.5 bu.

The corn getting the insecticides, at 36 inches high, was darker green, more uniform and taller. Final yields were about the same.

A treatment of 8 ounces of 25% lindane per 100 lbs. of corn is being tried this year in several Missouri counties. It is believed that this will be effective where wireworms are a problem. —University of Missouri Bulletin.

#### Tests With Octamethyl pyrophosphoramide

RESULTS of 2 year's experiments of much interest to greenhouse operators faced with the problem of combatting resistant spider mites on ornamentals, were recently reported by Floyd F. Smith and R. A. Fulton of the Bureau of Entomology and Plant Quarantine. They found octamethyl pyrophosphoramide to be effective against aphids and spider mites, including resistant strains of mites. At ordinary dosages, the material is not effective against other common greenhouse pests such as thrips, whiteflies, mealybugs, or several species of chewing insects.

A systemic insecticide, octamethyl pyrophosphoramide is absorbed into the plant through the roots, stems, or leaves, according to the method of application. Entering the sap stream, the absorbed material moves up the stem from the roots or lower leaves to the upper leaves and buds. Becoming sufficiently concentrated there, after a few days it is toxic to spider mites and aphids that feed on the sap in these parts of the plant. The material does not concentrate in the stems and therefore does not control aphids that feed thereon. It may be absorbed through either the upper or lower surfaces of the leaves.

For best results, these investigators recommend that applications (Turn to Page 97)

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AGRICULTURAL CHEMICALS

## INDUSTRY NEWS

#### Crawford New FDA Head



CHARLES W. CRAWFORD

Charles W. Crawford, deputy commissioner of the Food and Drug Administration, Federal Security Agency, became commissioner of F. & D. A. on June 1, it has been announced by Oscar W. Ewing, Federal Security Administrator. Dr. Paul B. Dunbar, for many years commissioner of the Administration, retired June 1. Dr. Dunbar was selected as one of the original group to undertake enforcement of the old Pure Food and Drugs Act of 1906. He was 69 on May 29th.

The new commissioner has been in government service for 34 years, and was Dr. Dunbar's deputy for some years before his latest appointment.

#### Innis, Speiden Co. May Sell

A special meeting of stockholders of International Minerals & Chemical Corp. was to be held in New York on June 27, to consider acquisition of Innis, Speiden & Co., according to Louis Ware, I. M. & C. Corp. president.

The board of directors will recommend that the number of authorized shares of common stock of the corporation, par value \$5 per share, be increased from 2 million shares to 2½ million shares.

Innis, Speiden & Co. was

founded in 1816. Its business consists primarily of manufacturing, refining and processing of caustic potash, carbonated potash, chlorine and chlorinated minerals.

#### CPR No. 22 is Issued

Ceiling Price Regulation #22, affecting pesticides and fertilizers, was issued recently by the Office of Price Stabilization. Although originally set to take effect on May 28, the date was later postponed to July 2nd.

Only manufacturers who gross \$250,000 or more annually come under the regulation. However, firms which gross less per year than this figure, may use the principle for price adjustment, the OPS says.

Under this general manufacturer's order, no individual company may increase prices above present ceilings without giving OPS 15 days' notice of intent. The new regulation permits manufacturers to add increased factory payroll and materials costs to pre-Korean prices. The new prices are based on periods April 1 through June 24, 1950 or any of the three previous calendar quarters.

It was emphasized that the order is not a "cost-plus" approach and that the regulation does not infer that future cost increases will be handled on a similar basis.

Due to the pricing system peculiar to the agricultural chemical industry, considerable disruption in operations has occurred. Since commitments for pesticides are made in the fall and winter of the year preceding the season of use, the new pricing system can affect adversely the supply of agricultural chemicals.

The inference might be made that a general roll-back in pesticide prices is in order. Such is not the case in all instances. Because prices of pesticides have been relatively low due to absorption of increased costs by manufacturers, order #22 may not change prices of many agricultural chemicals. In some instances, increases in prices may be allowable.

#### No CPR for Potassium Mur.

CPR 22 does not apply to sales of potassium muriate, according to a ruling of the Office of Price Stabilization on May 21. This ruling was obtained by the U. S. Potash Co., Sidney H. Bierly to C. F. A.



SIDNEY H. BIERLY

Sidney H. Bierly, above, has been named executive secretary and manager of the California Fertilizer Association. Les Angeles, to succeed Elmer S. Nelson who had held the post for a number o. years. Mr. Bierly was for ten years an executive in the Bank of America, and for the past several years had been connected with the California State Chamber of Commerce. He is well acquainted with California's agricultural problems, having operated a farm near Stockton.

New York, following its request for an interpretation of the case.

U. S. Potash pointed out in its request, that it mines sylvinite ore containing sodium chloride and potassium chloride and that clay and other impurities are removed from the ore. Sodium chloride is separated from the potassium chloride is the muriate of potash which is sold in two grades.

The OPS stated in its ruling: "It appears from the information set forth in your letter that the processes through which your company puts sylvinite ore are designed only to segregate its mineral content. Since the potash thus derived is a non-metallic mineral, your sales of such product are excluded from Ceiling Price Regulation 22 by virtue of paragraph (v) of appendix A thereof, and your ceiling prices therefore are established by the General Ceiling Price Regulation."

#### Cyanamid Turi Specialist

F. S. Washburn, director, Agricultural Chemicals Division, American Cyanamid Company, has an-



W. E. ZIMMERMAN

nounced the appointment of W. E. Zimmerman as turf specialist. In this capacity Mr. Zimmerman will promote the use of potassium cyanate for the control of crabgrass in turf and develop the possibilities of the use of calcium cyanamide for various purposes in connection with the establishment and maintenance of fine turf. He was formerly general agriculturist with American Cyanamid, but his wide experience in the field of turf and the rapid acceptance of potassium cyanate for crabgrass control brought about the appointment. His headquarters will be at Bloomfield. New Jersey.

#### Lion Oil Elects Tallman

Dr. Ralph C. Tallman has been named director of research for Lion Oil Company, T. M. Martin, president, has announced. Dr. Tallman, who has been manager of the planning and survey department of Lion Oil's Research Division since 1950, replaces Dr. Frank J. Soday, who has headed the Research Division since November 1947. Soday resigned his position, effective May 15, to assume the post of director of research for Chemstrand Corporation and will be located at Decatur, Alabama.

Dr. Tallman, a native of Cedar Rapids, Iowa, received his A.B. degree from Cornell College, Mt. Vernon, Iowa, in 1927 and his Ph. D. degree from Cornell University, Ithaca, New York, in 1931. For the four years following his graduation he remained at Cornell University as instructor in organic chemistry.

#### Int. Paper Co. Names V-P's.

At a meeting of the Board of Directors of International Papar Company held in New York, May 9, Stuart E. Kay and F. Henry Savage, veteran employees of the company, were elected vice-presidents.

#### New So. Alkali Pres.

E. T. Asplundh has been named president of Southern Alkali Corporation, a wholly-owned subsidiary of Pittsburgh Plate Glass Company.

Associated with the parent company's chemical operations since 1919, Mr. Asplundh has served as vice-president in charge of Pittsburgh's Columbia Chemical Division since 1940 and as vice president of Southern Alkali since 1944.

Clarence M. Brown, board chairman of Pittsburgh Plate Glass Company since 1931 and a member of Southern Alkali's board of directors since the subsidiary's incorporation in that year, has been named chairman of Southern's board of directors, a newly created position.

Also continuing as directors of Southern Alkali Corporation are Harry B. Higgins, Harold P. Pitcairn, Raymond Pitcairn and Dwight Means. Mr. Higgins will serve as chairman of the executive committee and Mr. Means as a vice president.

New directors and officers are Leland Hazard as vice president and general counsel and W. I. Galliher as a vice president. Additional directors are Richard B. Tucker and E. D. Griffin.

Pittsburgh Plate Glass Company recently transferred its Columbia Chemical Division to Southern Alkali Corporation. Southern Alkali now operates 5 chlorine, alkali and related chemical producing plants.

#### To Represent Chapman Co.

B. B. Heifner, Alcoa, Tenn., has been employed as sales representative in the agricultural division



B. B. HEIFNER

of the Chapman Chemical Company, Memphis, Tenn. He will represent Chapman in Louisiana and Southwestern Arkansas. Prior to his employment by Chapman he was a pilot for the Georgia School of Aviation, Crop Dusting Division.

Chapman manufactures a complete line of organic agricultural insecticides. Heifner attended the University of Tennessee and has an entomological background.

#### **Westvaco Personnel Shifts**

S. Philip Marcus has been made assistant production manager, Westvaco Chemical Division, Food Machinery and Chemical Corporation with headquarters in New York. Mr. Marcus succeeds Dr. K. C. Rule, now staff assistant to W. N. Williams, operating vice-president. Mr. Marcus was previously assistant to the manager of Westvaco's South Charleston, West Virginia plant.

Simultaneously, Robert A. Bondurant, Jr. has joined Westvaco's production staff at New York. Formerly executive vice-president of Michigan Chemical Corporation at Saint Louis, Michigan, Mr. Bondurant had worked on various assignments at Westvaco's South Charleston, West Virginia plant between 1936 and 1943.

#### Northwest Fertilizer Conference in Oregon

HE second annual Pacific Northwest Fertilizer Conference will be held June 28 and 29 at Oregon State College, Corvallis, according to B. R. Bertramson, chairman of the Department of Agronomy, State College of Washington, Pullman. The meeting is sponsored by the newly-formed Pacific Northwest Plant Food Association through its soil improvement committee. Featured on the program will be soils and fertilizer specialists from colleges, experiment stations, the U.S. Dept. of Agriculture and industry in the three northwestern states. Included on the program will be Dr. F. W. Parker, assistant chief, Bureau of Plant Industry, Soils and Agricultural Engineering, U.S.D.A., Beltsville, Md., and Dr. S. C. Vandecaveye, president of the Soil Science Society of America.

These fertilizer conferences originated at Puyallup, Washington, in 1950, for the purpose of disseminating the latest soil and fertilizer research information to the fertilizer industry and the agricultural public. The meetings are open to all. It is expected that fertilizer dealers, soil fertility specialists and field men concerned with soil fertility problems will swell the attendance to well over 500. While attendance will be largely from Oregon, Washington and Idaho, good representation is expected also from British Columbia, Alberta, Montana and Utah.

Starting at 8 a.m. on June 28th, the discussions will cover the fertility problems for vegetables and small fruits, forage crops, wheat, and sugar beets. Also included are talks on the latest developments in fertilizer placement machinery and a trip to the field trials of the Oregon State College Soils Department. While chief emphasis will be on Western Washington and Oregon conditions, problems of the irrigated and dryland farming areas of the three states will also be discussed. Program chairman for the conference

is Dr. R. A. Pendleton, stationed at Soils Department of Oregon' State College. He is a soil scientist of the U. S. Department of Agriculture and is also a member of the Soil Improvement Committee of the Pacific Northwest Plant Food Association.

In a pre-conference meeting on June 27th, soil and plant analysis specialists will meet for discussions on methods of analysis and interpre-

#### MEETINGS

National Fertilizer Association, Greenbrier Hotel, White Sulphur Springs, W. Va., June 11-13.

American Plant Food Council. The Homestead, Hot Springs, Va., June 14-17.

Pacific Slope Branch, A.A.E.E., Edmond Meany Hotel, Seattle. Washington, June 19-21.

33rd Annual Meeting Amer. Phytopathological Soc., U. of Calif. (Los Angeles) June 19-21.

Annual Meeting of Pacific Northwest Fertilizer Dealers and Manufacturers. Corvallis. Oregon. June 28 & 29.

Del-Mar-Va Peninsula Fertilizer Conference, George Washington Hotel, Ocean City, Md., June 30, 1951.

Annual Meeting to Consider Fertilizer Grades. Buccaneer Hotel. Galveston, Texas, July 19 & 20.

American Society of Agronomy, State College, Pa., August 13-15. 27th Annual Convention. National Shade Tree Conference Netherland Plaza Hotel. Cincinnati. Ohio., Aug. 27-31.

National Agricultural Chemicals Association, Essex and Sussex Hotel, Spring Lake, N. J., September 5-7.

American Society for Horticultural Science, Minneapolis, Minn., September 5-7.

12th International Congress of Pure and Applied Chemistry, New York City, September 10-13, 1951. Cotton Mechanization Conference.

Cotton Branch Experiment Station. Chickasha. Oklahoma. Nov-8 & 9.

Combined meetings of American Association of Economic Entomologists; Entomological Society of America: American Phytopathological Society; and the Potato Association, Netherland Plaza Hotel, Cincinnati, Ohio, December 9-13.

11th Annual Meeting, Northwest Vegetable Insect Conference, Imperial Hotel, Portland, Oregon, January 21-23, 1852 (David H. Brannon, Pullman, Washington, Secty.) tations. College and commercial laboratory chemists will speak on the latest developments in their soil and plant testing programs. A special question-answer session is scheduled for the afternoon to stimulate discussion and exchange of ideas on this aspect of the soil fertility program. This meeting is called "pre-conference" because it will be of benefit chiefly to those trained in the technical phases of soil and plant analysis, but attendance is not restricted.

#### Monsanto Ups Sherwood

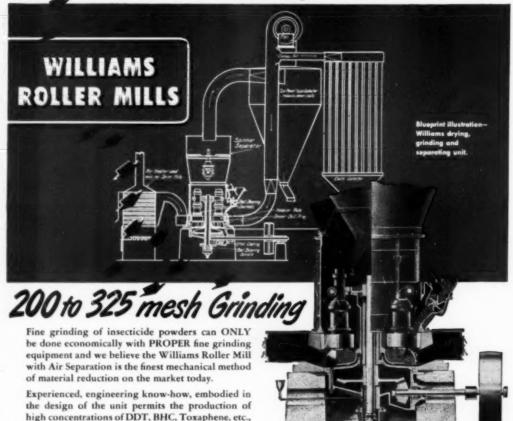
Dr. Lloyd V. Sherwood of Dayton, Ohio, has been appointed manager of the agricultural chemicals section of Monsanto Chemical Company's Organic Chemicals Division development department, it was announced by the company in May. He replaces Robert W. Towne of St. Louis, who has been transferred to The Chemstrand Corporation, a jointly-owned subsidiary of Monsanto and American Viscose Corporation. At the same time, Robert R. Wangerin, also of St. Louis, has been appointed assistant to Dr. Sherwood.

Dr. Sherwood, who has been with Monsanto's Central Research Department at Dayton, will continue temporarily to conduct special field work there on a soil stabilization program. Dr. Sherwood received his Ph. D. in agronomy at the University of Illinois in 1936 and joined Monsanto in 1946.

#### Sidwell to Reasor-Hill

Dr. Albert Sidwell, recently director of research for the American Medical Association and assistant director of research for Pittsburgh Plate Glass Company, has been named director of research for the Reasor-Hill Corporation of Jackson-ville, Ark., manufacturers of agricultural insecticides. Dr. Sidwell and Dr. Lyle Hill, president of the corporation, were classmates at the University of Chicago in 1931.

The new director will handle production control of insecticides and will direct research in all phases of agricultural chemical development. For those Fine Grinding Jobs . . .



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

#### WILLIAMS ALSO MAKES . . .

Heavy Duty Hammer Mills for crushing and grinding rock phosphote, gypsum, limestone . . . also for disintegrating ammenium sulphate lumps and fertiliser mixes that "set-up" in storage. The Helix-Seal Pulverizer for disintegrating and blanding insecticide mixes and concentrations ready for use.

WILLIAMS PATENT CRUSHER & PULVERIZER CO. 2707 N. BROADWAY ST. LOUIS 6, MO.

Williams Roller Mills are available in a full range of sizes.

thoroughly blended. Also pulverizes Pyrethrum,
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mesh are obtainable and can be consistently main-

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opening to finishing product bin, all automatically

handled, makes this unit additionally desirable for

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GRINDERS

AGRICULTURAL CHEMICALS

#### Cotton Outlook Favorable

Prospects for adequate materials being available for producing the desired 16,000,000 bales of cotton in 1951, appeared to be brighter than before, the board of directors of the National Cotton Council was told at a meeting in Memphis, Tenn., on May 9.

In a report by Claude L. Welch, director of the Council's production and marketing division, it was pointed out that production of insecticides may exceed that of last year: that fertilizer output will be greater (but added demand may more than offset this advantage; that manufacture of boxcars is proceeding fast enough that distribution of agricultural materials may be helped; that wrapping materials and steel bale ties will probably be sufficient, although this depends upon allocations and other factors; and more farm machinery is available than ever

Mr. Welch reported that toxaphene, BHC, calcium arsenate, aldrin, dieldrin, and other insecticides are being produced in increased quantity, but added that insecticide demand is expected to be heavy due to increased acreages in output and because of the large number of boll weevils that survived the winter.

The fertilizer picture, according to Mr. Welch, looks favorable, with an expected 20 percent increase of nitrogen and a 15 percent greater production of potash. However, availability of superphosphate may be three percent less than last year because of the sulfur shortage, it was pointed out.

#### Westvaco Plans Expansion

Westvaco Chemical Division of Food Machinery and Chemical Corporation will construct a fourth electric furnace unit for the manufacture of elemental phosphorus at its Pocatello, Idaho plant, it has been announced by the company. Two furnaces presently are in operation at this location and a third will be on the line around July 1. Power will come from the hydroelectric system

of the Idaho Power Company and phosphorus rock from the nearby deposits of the Fort Hall Indian Reservation. Simultaneously, the company plans to expand its facilities for processing phosphorus into various grades of phosphates at existing phosphate plants.

Engineering construction contracts for these units have been let to the Bechtel Corporation of San Francisco with responsibility for basic design in the hands of John D. Anderson, chief engineer of the Westvaco Division, and his staff. Completion of the furnace at Pocatello and additional phosphate producing facilities are contemplated by mid-

#### **PCO Fraternity Formed**

A national professional pest control fraternity, Pi Chi Omega, has been formed at Purdue University, Lafayette, Ind., according to Hanlan R. Schuyler, secretary-treasurer and charter member of the new group. The fraternity, which will be known as "PCO" for "pest control operators" as well as an abbreviation for its Greek letters, is an outgrowth of the first four-year curriculum in pest control established at Purdue in 1946.

Purposes of the new fraternity, are as follows:

- To further the science of pest control.
   To encourage and promote the formal education of potential members of the
- pest control industry.
  3. To cooperate with the National Pest Control. Association in furthering its
- To further information that would be of significance to members of the pest control industry.
- 5. To further public respect and confidence in professional pest control-

Six students and Professor John V. Osmun of the department of entomology comprise the charter membership. At present, twenty members from 9 states are included. Four honorary members are Dean Vern C. Freeman, Purdue College of Agriculture, J. J. Davis, chief, Dept. of Entomology; H. O. Deay, professor of entomology, and Wm. O. Buettner, Brooklyn, N. Y., executive secretary of the N. P. C. A.

#### Colo. Field Day July 10

July 10 is the date set for the annual field day for the Mountain Meadow Research Investigations to be held at Gunnison, Colo. This research work is a cooperative effort between the Colorado Experiment Station, the Soil Conservation Service and the Bureau of Plant Industry, Soils, and Agricultural Engineering.

Major objectives will include finding best ways for irrigating, proper types of grasses and legumes to be grown and the fertilizer elements required as well as most effective amounts and ways of application. A similar meeting held last year attracted some 400 ranchers in addition to scientists from surrounding areas, representatives of various manufacturers of agricultural chemicals and others. This year's event is expected to exceed the records made in 1950.

#### Lownsbery to Conn. Staff

The appointment of Dr. Benjamin F. Lownsbery to the staff of the Plant Pathology Department of The Connecticut Agricultural Experiment Station has just been announced. Dr. Lownsbery will work on plant diseases in Connecticut and will be particularly concerned with diseases caused by root lesion nematodes.

Dr. Lownsbery was formerly a member of the Division of Nematology of the U. S. Department of Agriculture, working at Beltsville, Md. He was also previously an assistant professor in the Department of Plant Pathology at Cornell University, Ithaca, N. Y. At one time, he was control chemist for E. I. duPont deNemours and Company, Inc., working in Oklahoma and New Jersey.

#### Del-Mar-Va Fert. Meeting

The Del-Mar-Va Fertilizer Association will hold its annual meeting at the George Washington Hotel, Ocean City, Md., Saturday, June 30, according to Edgar H. McGrath, Farmers & Planters Co., Salisbury, Md., treasurer of the Association. Details of the program were not available at press time.

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Active body of businessmen serving the nation through Agriculture by furthering better and more complete control of insects, diseases and weeds.

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## South Carolina Host to Fertilizer Tour

ABOUT 275 fertilizer manufacturers, dealers, salesmen, and others doing business in South Carolina, and agricultural workers and others concerned with crops and livestock production in the area, attended the one-day tour of the Clemson Truck and Coast Experiment Stations near Charleston and Summerville, respectively, on May 16. They observed experiments affecting truck crops, beef cattle, and pastures under Coastal area conditions.

The keynote for the tour was given by Dr. R. F. Poole, president of Clemson College, in an address during the noon hour. He pointed out the wisdom of learning more about the finer points of agriculture, especially the response of plants to fertilizers. He stated that the fertilizer industry recognizes the wisdom of cover crops to be turned under to help keep a nutritional soil balance

#### By S. C. Stribling

Agricultural Editor Clemson Agricultural College

and to provide proper soil conditions for the growth and functioning of bacteria and fungi, all of which make for more efficient farming.

Other speakers at a short midday barbecue dinner at the Coast Station were—Dr. Russell Coleman, Washington, D. C., president of the National Fertilizer Association; J. T. Lazar, Florence, district agent, Clemson Extension Service; Dr. H. P. Cooper, director of South Carolina Experiment Station; and E. D. Kyzer, superintendent of the Coast Station.

Dr. Coleman pointed to the nation's need for more meat and to the fact that a good grassland farminglivestock program is being developed

(Top photo) Entire group at Truck Experimental Station. (Lower photo) Portion o! group studying results with cantaloupes and beans. in the South. He urged members of the fertilizer industry to familiarize themselves with sound pasture fertilization practices so that when normal times return, they will be in a position to help farmers continue to fertilize their pastures. He said that properly fertilized pastures are now returning about 6 to 1 on the money invested but that, even should this ratio drop to 2 to 1, fertilizers for pastures will still be a good investment.

Mr. Lazar said that great agricultural progress is being made in South Carolina through the teamwork of educational agencies, the fertilizer industry, and farmers of the state. He declared that the practice of spreading fertilizers on pastures will likely be used for other crops also. The fertilizer industry was thanked for its cooperation in promoting pasture and corn contests which contribute to better farming.





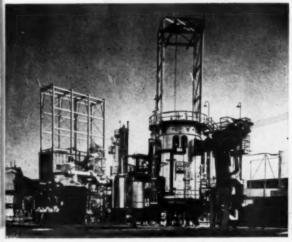
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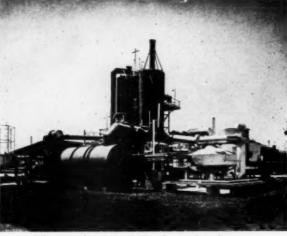
Fertilizer Plant in MEXICO

n**ow in** operation

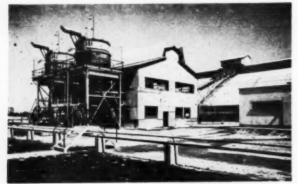




Hydrogen from natural gas and nitrogen from the air are combined in proper proportions under pressure to form ammonia.



Sulfur, removed as an impurity from the natural gas, become the raw material for the manufacture of sulfuric acid.



This ammonia and sulfuric acid are combined to produce 70,000 tons of ammonium sulfate per year.

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Chemico Plants are Profitable Investments

Director Cooper stated that, only in recent years have farmers discovered that pastures in general, need more fertilizers than do other crops. He said that lime alone is not enough but a consistent and heavy fertilizer program for pastures is needed and that potash is especially necessary. He cautioned that, unless farmers fertilize their pastures properly, they will soon have "piny woods" pastures again. This statement was given emphasis later in the afternoon when a properly fertilized pasture with plenty of potash was shown beside a plot where no fertilizer or potash had been used. Comparison of the two pasture areas illustrated the point.

Mr. Kyzer told of the work being conducted on the 780-acre farm belonging to the station in pasture improvement and the cross breeding of Angus, Hereford, and Brahman breeds of beef cattle.

During the morning the group toured the Truck Station, where Dr. W. C. Barnes, station superintendent, and his staff explained the experiments in breeding, fertilization, insect and disease control, and other factors influencing yields, quality, and marketing characteristics affecting a number of crops.

During the afternoon tour of the Coast Station, the group observed summer pastures of Dallis grass and Ladino clover and winter pastures of fescue and Ladina clover and the benefits of lime, phosphate, and potash as shown in the growth of both grasses and clovers.

B. D. Cloaninger, head, Clemson Fertilizer Inspection and Analysis Department, arranged the tour, assisted by members of the staffs of the two stations visited and by representatives of Clemson Extension Service and of various other agricultural agencies and commercial organizations. Trucks for the tour were provided by nearby fertilizer companies or dealers.

Out-of-state visitors on the tour and the organization with which each is connected, included: Dr. Frank E. Boyd, Montgomery, Ala., V. C. Chemical Co., Dallas Cantwell, Atlanta, Ga., Spencer Chemical Co., Borden S. Chronister, Richmond, Va., The Barrett Division; Dr. Russell Coleman, Washington, National Fertilizer Association; H. G. Cunningham, Atlanta, Ga., Tennessee Corporation; Walton S. Dennis,

Raleigh, N. C., International Minerals and Chemical Corporation; J. Merton Eggles-Va., Robertson Chemical ton, Norfolk, Corporation; Robert C. Fitzgerald, Wilmington, N. C., Smith-Douglass Co., Inc.; S. Gilson and S. T. Gilson, Thomson, Ga., International Fertilizer Co.; W. W. Harley, Savannah, Ga., Southern Fertilizer and Chemical Co.; M. E. Hunter, Richmond, Va., The Barrett Division; B. P. Johnson, Thomson, Ga., International Fertilizer Co.; Dr. H. B. Mann, Wash-ington, D. C., American Potash Institute, Inc.; J. C. Morcock, Atlanta, Ga., The Barrett Division; Frank Mikell, Statesboro, Ga., Armour Fertilizer Works: J. T. Murray, Savannah, Ga., Mutual Fertilizer Co.; J. A. Naftel, Auburn, Ala., Pacific Coast Borax Co.; William Perry, Sardis, Ga., Armour Fertilizer Works; Dr. J. Fielding Reed, Atlanta, Ga., American Potash Institute, Inc.; E. F. Savage, Griffin, Ga., Georgia Experiment Station; O. H. Stanard, Raleigh, N. C., American Limestone Co., Knoxville, Tenn.: C. H. Stanton, Wilmington, N. C., Swift and Co.; L. G. Walton, Wilmington, N. C., T. W. Wood and Sons; Roy Williams, Elm City, N. C., Farmers Cotton Oil Co., Wilson, N. C., Albert Woods, Raleigh, N. C., Potash Co. of America, Inc.: L. N. Cook, Savannah, Ga., Southern Fertilizer and Chemical Co.; B. W. Davis, Savannah, Ga., Southern Fertilizer and Chemical Co.; John L. Cope, Savannah, Ga., Reliance Fertilizer Co.; J. L. French, Richmond, Va., V. C. Chemical Co.; and Dr. S. F. Thornton, Norfo'k, Va., F. S. Royster Guano Co.

#### Shade Tree Conf. in August

The 27th Annual convention of the National Shade Tree Conference will be held at the Netherland Plaza Hotel, Cincinnati, Ohio, August 27-31, according to Dr. L. C. Chadwick, of the Horticulture Department of Ohio State University, Columbus, secretary-treasurer of the Conference. Details of the program had not been announced at press time, but Dr. Chadwick indicated that they would be available later.

#### To Get S From Natural Gas

Phillips Chemical Company will soon start construction of a large sulfur extraction plant in West Texas, according to an announcement by K. S. Adams, chairman, and Paul Endacott, president, of both Phillips Chemical Company and its parent, Phillips Petroleum Company.

This plant is designed to extract from natural gas nearly a quarter of a million pounds of elemental sulfur per day and will be located in the Permian Basin oil fields near Goldsmith. The output will be used by the company in connection with its ammonium fertilizer plant at Adams Terminal near Houston.

#### S. Carolina Corn Contest

With an average of 87.4 bushels per acre, some 1,390 contestants took part in the 1950 South Carolina corn contest, and 111 were admitted as new members in the "100 bushel corn club", according to H. A. Woodle, leader in agronomy extension work at Clemson Agricultural College.

The contest was the third to be held in South Carolina. In 1949 a committee representing the state's fertilizer industry made it possible for the extension service to conduct a contest. This committee, representing the fertilizer industry, was the nucleus of a new and broader organization, the South Carolina Plant Food Educational Society, which sponsored the 1950 State corn contest. A. D. Kincaid of the Southern Cotton Oil Company, Columbia is president of the society. He advises that plans are under way to hold a similar contest during the summer of 1951.

#### Innis, Speiden Names Two

F. E. Strauch, Chicago Branch Manager of Innis, Speiden & Co., New York 6, N. Y., has been appointed midwestern district manager, it was announced recently by W. H. Sheffield, president. At the same time, Mr. Sheffield also announced the promotion of A. M. Oster, assistant branch manager to Chicago branch manager.

#### Lion Executive Dies

Henry L. Taylor, 62, assistant manager of chemical sales for Lion Oil Company, died May 23 at Lumberton, North Carolina, after a brief illness. Mr. Taylor became affiliated with the Lion sales organization in 1946. During World War II he was in charge of nitrogen allocations for the War Production Board in Washington, and before that time was a fertilizer broker in Wilmington, North Carolina.

# Costly HIGH PRESSURE SPRAYING CAN NOW BE ELIMINATED

CORN TOBACCO CABBAGE RICE OATS PEAS FLAX TEA HOGS BEANS GRASS WHEAT POTATOES CATTLE GRAPES ONIONS ORANGES BANANAS SHEEP CHERRIES LEMONS CARROTS PEACHES PLUMS RYE PRUNES BERRIES ALFALFA



# OBERDORFER Low Pressure ROTARY GEAR PUMPS

may be used efficiently for every phase of agricultural spraying

We are convinced that Oberdorfer low pressure bronze pumps, given the proper spray nozzle designs, are completely effective for all agricultural spraying. If this is so, there is no longer any need for the expensive high pressure equipment here-tofore used in specialized spraying operations such as livestock, orchards, potatoes, shade trees, etc.

We base this statement on extensive research conducted by individuals and public and private agricultural research organizations, as well as on our own extensive experience. Since 1897, when the first Oberdorfer bronze rotary gear pump was made, we have learned something of their range of utility. We have had millions of opportunities to do so, particularly in the past few years when insect and disease control by spraying have become an essential procedure in all successful animal husbandry and plant cultivation.

#### OBERDORFER PUMPS AVAILABLE WITHOUT CHARGE FOR TESTING

We will provide any agricultural college, experiment station, extension worker or county agent with an Oberdorfer pump free of charge for test purposes.

Simply send us information about your spraying problem and we will give you one of the 300 Oberdorfer Spraying Pumps best adapted to meet your requirements according to information we presently have available. Address:

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The name "OBERDORFER" is cast on every one of our more than 300 spraying pump styles and sizes. Look for it. It guarantees Extra Value.

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**APPLES** 

SORGHUM

PINEAPPLE

SOY BEANS

SUGAR CANE

SUGAR BEETS

## Suppliers' Bulletins

#### Offers Heavy-Duty Breaker

Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill., has developed a heavy-duty impact breaker for reducing a variety of bulk raw materials in chemical processing. When used as a primary breaker in production of agricultural lime and phosphates, the unit may be adjusted to produce a high percentage of finished material keeping secondary crushing loads to a minimum, the makers state. The breaker, called the "PMCO Impact Master", features "controlled impact action" which directs flow of material through machine to produce uniform gradation. Complete literature is available from the company.

#### **New Fertilizer Spreader**

Hercules Steel Products Corp., Galion, Ohio, has published an illustrated bulletin describing its spreader for fertilizers and lime. It is designed to prevent waste of materials, spotty concentration and possible soil burn. A special all-weather discharge mechanism applies limes and fertilizers evenly. Write for descriptive bulletin No. 5050.

#### Twin Shell Blender

A new twin shell blender has been placed on the market by Patterson-Kelley Co., Inc., East Stroudsburg, Pa. It consists of two cylindrical shells joined to form a "V", with a dust-tight discharge valve at bottom. The makers state that a perfect blend is obtained in a few minutes, the time depending upon the types of materials. Descriptive literature is available.

#### Offers Crabgrass Killer

Under the trade name of "Crab-Not", the Nott Mfg. Co., Mount Vernon, N.Y., has marketed a line of potassium cyanate herbicides packaged in units from four ounces of wettable powder to six pound packets. The crabgrass control material comes either as potassium cyanate alone or with 2,4-D. The makers invite inquiries and literature is available.

#### "News Digest" Available

The "Toxaphene News Digest", published by Hercules Powder Co., Wilmington, Del., presents late information on the grasshopper situation in its May issue recently distributed. A map of the U. S. is featured, showing areas where the 'hopper threat is menacing or serious. Information on the use of toxaphene for control of cotton insect pests as well as for control of the grasshoppers, is included in the bulletin. Copies of the "News Digest" are available from Hercules Powder Co., 970 Market St., Wilmington 99, Del.

#### **New Grader Marketed**

The Exolon Company, Tonawanda, N. Y. has placed on the market a "Multi-Form Grader" for the purpose of meeting difficult grading specifications. According to the makers, the grader will render from 7 to 9 finished grades of a given material at one time.

The manufacturers point out the following advantages in their product: long screen life; minimum floor space required; low cost of power (one H. P. motor); plugging of screens reduced to minimum; noise and vibration reduced through absence of eccentric and shaft; each unit selfcontained; complete dust-proofing made easy; fine grades produced quickly, and complete flexibility.

Descriptive bulletins are available from the company at Tonawanda, N. Y.

#### Monsanto Booklet

A twenty page instruction booklet for the use of Santobane (DDT) dusts or sprays to control insects is available from Monsanto Chemical Company, St. Louis, Mo.



Transitier Truck Co., Portland, Oregon, manufacturers of "Hi-Duty" lift trucks, has placed on the market the above-illustrated machine which features unusual flexibility and adaptability. The bucket may be removed and replaced with lift forks in a few minutes, thus

converting the machine for handling bags and other materials other than bulk. The makers point out that the shovel is designed to clean up along walls and in corners. The bucket has a 9 cubic foot capacity. Descriptive literature is available from the company. The booklet describes the several types of DDT formulations, including dusts, wettable powders, emulsions, solutions and aerosols and discusses the best uses for each.

Type of formulation, timing, dosage and necessary equipment are detailed.

#### Dynamite Kills Worker

Henry W. Levick, 52, employee of N. S. Koos & Sons Fertilizer Co., Kenosha, Wis., was killed recently while preparing to place a charge of dynamite in a pile of fertilizer stored in a bin. The explosive was to loosen cured fertilizer. It was not determined what caused the blast.

#### **Hyman Bill Reduced**

The Colorado Supreme Court on May 28 affirmed with modifications, a judgment of \$1,800,000 in favor of the Velsicol Corp., Chicago, against Julius Hyman & Co., Denver. The suit was instituted by Velsicol Corp. to recover alleged damages suffered when the Hyman Company began the manufacture and sale of Chlordane, to which Velsicol claims exclusive rights to make and market.

The Supreme Court's decision, written by Justice Wilber M. Alter, modified the lower court's judgment to permit allowances for Federal income taxes paid by the Hyman Company. The court said this would reduce the amount the Hyman company must pay Velsicol, to \$1,238,000.

#### **BEPQ** Being Reorganized

A reorganization of regulatory and control operations and administrative functions of the Bureau of Entomology and Plant Quarantine, U.S.D.A., was announced May 28, by Secretary of Agriculture, Charles F. Brannan.

Purpose of the reorganization, said Avery S. Hoyt, Chief of the Bureau, "Is to get the most possible good from the Bureau's manpower and equipment resources."

The direction of the Bureau's

regulatory and control operations and administrative functions will be coasolidated under single administrative heads in five areas. These are:

Northeast Region, headquarters, Greenfield, Mass., director, Roy G. Richmond. Southeast Region, headquarters, Gulfport, Miss., director to be announced later. Southwest region, headquarters, San Antono, Texas, director, Dr. L. F. Curl. Western region, Berkeley, Calif., director, W. V. Benedict. North Central region, Minneapolis, Minn., director, Harry L. Smith.

#### Camp Joins SW Potash

Thomas E. Camp, Jr., has joined Southwest Potash Corp., New York, as vice-president in charge of sales. Mr. Camp was formerly Division Manager of Armour Fertilizer Works, Atlanta, Ga. Southwest Potash is a wholly-owned subsidiary of American Metal Co., Ltd., New York. The firm expects to begin production in 1952.





AILED by those in attendance, as an "outstanding success", the first cooperative meeting of the National Agricultural Chemicals Association's Information Committee and a Land Grant College was held on the campus of Rutgers University, New Brunswick, N. J., May 22 and 23. Members of the committee, with a number of guests, heard first-hand reports of agricultural research projects under way at Rutgers, the State University of New Jersey. William H. Martin, director of the New Jersey Agricultural Experiment Station and Dean of the College of Agriculture,



In The Photos

Above (R): Committee members at Rutgers. Front. (I to R) Art Bixby: Dick Yates: Carlos sampmeier, chairman: Jack Brunton: Russell Dorman and Hardeld Cunningham. Second row: Dr. Alfred Weed: D. C. Van Winkle: Henry J. Wood: Gene Perrin: Val Weyl: and Monte Budd. Back row: George Krieger: L. Gordon Utter. Wallace S. Moreland: "Petc" J. McManua: John Rodda and Jack Vernon.

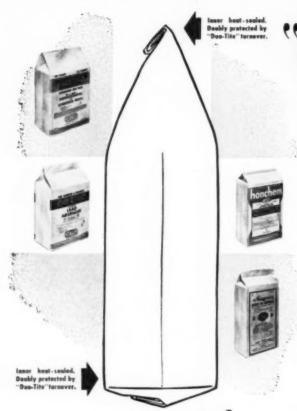
Center photo: Rutgers personnel taking part in Log Cabin session. Front row (I. to R): Erwin R. Biel: Firman E. Bear: Dean William H. Martin: Bailey B. Pepper and Harry C. Kohl, Jr. Back row: Benjamir hi. Davis: Donald D. Hill: Walter A. Maclinn: Harry E. Besley: Van Wie Ingham: and Norman F. Childers.

Below: Entire group attending the New Brunswick meeting. Photos by Rutgers University.





## Positively will not permit SIFTING



# Duo-Tite" Bag

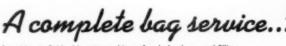
FOR POWDERED CHEMICALS

If there is any bag that positively won't permit dry particles to sift, this is it! Betner's new method of construction combines special liners with folding, gluing and heat-sealing in such a way that there is virtually "No Sift" for contents. This new Betner bag is perfect for insecticides, fertilizers and other chemicals that must be packaged in sift proof containers. It is also ideally suited for packaging foods. Available in sizes holding from 1 to 25 lbs.

of bulk powdered material; can be pre-printed up to four colors; and can be made in several combinations of materials.

and...

Betner can supply the special machinery for closing the "Duo-Tite" bag . . . it heat-seals, double folds and pastes the tops in exactly the same manner as the bottom is constructed.



from idea to finished bag to machinery for closing bags and filling and closing liner bags for cartons. Your inquiries are welcome, and samples with full technical information will be supplied promptly.

## Benj C Betner Co DEVON, PA.

BENJ. C. BETNER CO. of VA., Richmond, Va.; BENJ. C. BETNER CO., of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angolas, California; Southern Packaging Corporation, Affiliate of BENJ. C. BETNER CO.

presided at the speaking sessions, while Carlos Kampmeier, Rohm & Haas Co., Philadelphia, chairman of the NAC Information Committee, presided at the two dinner sessions on Tuesday and Wednesday nights.

In addition to Dean Martin's welcoming remarks, the Committee heard from Harry E. Besley, chairman of Agricultural Engineering at Rutgers; Erwin R. Biel, chairman of the Meteorology Department; Benjamin H. Davis, professor of Plant Pathology; Donald D. Hill, exchange professor from Oregon State Co'lege; Andrew H. Forgash, research fellow in entomology; Ralph P. Reese, dairy research specialist; Norman F. Childers, chairman of the Department of Horticulture; Walter A. Maclinn, chairman of the Soils Department.

Following a luncheon served at the University's "log cabin" situated at the side of a small lake, the group was taken on a tour of the University's greenhouses and experimental plots. Dr. John W. Bartlett, chairman of the dairy department, briefed the visitors on developments in cattle breeding, particularly on artificial insemination. Dr. Walter A. Maclinn invited the committeemen to sample scientifically-grown vegetables which had been treated with various insecticides under controlled conditions. His food technology laboratory was inspected by the visitors.

The NAC men then visited the virus laboratory where Dr. Vincent Groupe' explained the work in this field. Next stop was brand new Lipman Hall (scheduled to be dedicated this month) where Dr. Walter Nickerson lectured briefly on the place of antibiotics in agriculture. He indicated that certain compounds have been developed to halt plant diseases, but more time is required to learn methods of applying these materials which have indicated pathogenicity in the laboratory.

The floriculture greenhouses of of the University were explained by Harry C. Kohl, Jr., associate extension specialist, who exhibited orchids which had been fed different quantities of plant food and treated with various pesticides.

Dr. Bailey B. Pepper took the

group through the entomology laboratories where experiments are being conducted on insect resistance to pesticides; where the effect of insecticidal residues in soils is studied; and where new chemicals are screened for possible pesticidal activity.

In inaugurating the initial meeting of the Committee, Mr. Kampmeier, chairman, pointed out that the group had come to Rutgers with appreciation of the job being done by the university for agriculture. He said that industry, colleges and experiment stations are partners in a "hot war" against insect and disease pests that cost farmers ten billion dollars a year. Compared to this figure, the wholesale value of pesticides sold last year was only 200 million dollars, or about 2% of losses. In view of this picture, he said, the job is far from complete despite the notable advances of agricultural research over the past years, but this is not to say that the problem will never be solved. "It can be solved and it will be solved", he concluded.

Dr. Biel's talk on meteorology pointed out the relationship of weather conditions to insect and disease infestations. He declared that factors of rainfall and temperature affect insect life, and therefore such matters should be taken into consideration in making recommendations. Differences in temperature and humidity are very pronounced between a point near the ground as compared with an altitude of several feet above the soil, from which point such data is usually obtained. Dr. Biel said that the climate two inches above the ground may be completely different from that found on top of a building. The variation of several degrees in temperature may be equivalent to the weather at a point hundreds of miles away from the spot.

Dr. Davis reviewed some of the chemical developments in foliage and seed protectants, fumigants and chemotherapeutants. He pointed out that mere fungicidal activity of a compound is not sufficient to call it a fungicide. Matters of phytotoxicity and other considerations must be studied thoroughly.

Dr. Hill termed the develop-

ment of herbicides as "fabulous", but added that there are still many untouched potentialities of weed control. "We are just now getting down to fundamentals", he declared, pointing out that most of the progress in weed control has been made in the past decade.

Mr. Forgash described theproblems involved in entomological research, particularly in the physiology of insects, such as the respiratory tract which presents many vulnerable points for attack.

In his talk on soils, Dr. Bear compared the United States of 1951 with the same area of 1607 when only 800,000 persons were here. The population has grown to 150 million, he reminded, and the trend continues upward at the rate of some 65,000 per day while thoughtless agricultural methods in many parts of the country are depleting the land. Some 45 million tons of soil amendments are applied to the land each year in the U. S., he said, but the full potential of crop yields has not been realized. Crop land in the U.S. could support a population of a billion people "if it had to", he declared.

Deploring the manner in which tractors and other mechanical equipment are "tearing up the land", Dr. Bear told the group that the presence of  $3\frac{1}{2}$  million tractors on U. S. farms can bring about widespread ruin to soil if they are used unwisely, but on the other hand they are a boon to agricultural production if employed with good judgment.

The importance of minor elements was emphasized by Dr. Bear, who stated that their usefulness was unknown ten years ago. As little as one part per billion of molybdenum, for instance, makes a difference in the yield of alfalfa, and at 1 pound per acre, has increased alfalfa yield by 13 percent.

#### King on European Trip

Harold King, president of Prentiss Drug & Chemical Co., New York, left in mid-May, accompanied by Mrs. King, on a brief trip to Europe. They made the voyage across on a private yacht, and planned to return early in June on the Vulcania.

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#### New effectiveness in fly and insect control

Dairymen and farmers will find it profitable to use Dow Lindane-25 %-Wettable and Dow Lindane-20 %-Emulsifiable during any season of the year for fly and insect control in dairy barns, milk houses, creameries, milk processing plants and farm buildings. One spraying remains effective for 3 to 6 weeks. Besides controlling even those flies resistant to other insecticides, Dow Lindane formulations control lice and mange mites on dairy cattle—as well as ticks, lice and mange mites on sheep, beef cattle, hogs and horses.

The Dow jobber, the Dow salesman and The Dow Chemical Company will welcome your business.

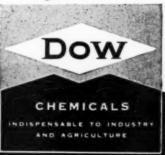
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#### Stauffer Gets Benzene

Stauffer Chemical Co. recently received at Los Angeles harbor, 300, 000 gallons of benzene, the first to be produced in the Hawaiian Islands. The company points out that the shipment will help to relieve the benzene shortage in the U. S. and will make possible continued production of BHC and DDT insecticides in the Stauffer plants.

The benzol is derived as a by product of cracking of oil to gas by the Honolulu gas company. Pacific Refiners, Ltd., refine the crude benzol and sell their current output under contract to Stauffer. The material will be trucked to Stauffer's plant at Henderson, Nevada, the company has stated.

#### Martin New Adv. Manager

Donald M. Martin, formerly sales manager of the organic chemicals division, is now advertising manager of the Antara Products Division of General Dyestuff Corporation, New York City, the company has amounced.

#### Ammonia Safety Studied

Groups concerned with the manufacture, distribution, and use of anhydrous ammonia and ammonia solutions have recommended that the American Standards Association organize a committee to develop safety standards, the ASA has announced. It was proposed that the work cover design, construction, location, installation, and operation of anhydrous ammonia systems as well as transportation and storage of anhydrous ammonia and ammonia solutions. Ammonia manufacturing plants, refrigerating, and air conditioning systems would not be included.

Problems of handling and storing anhydrous ammonia have assumed increased importance because of the increasingly widespread use as a fertilizer. Since anhydrous ammonia is usually transported in liquid form under pressure in tanks or cylinders, the relation between the strength of the tank and the pressure and temperature under which the gas is handled will be one of the problems to be given careful consideration.

Recommendations of the conference will be referred to the Safety Code Correlating Committee of the American Standards Association for final decision as to whether a committee will be set up under ASA procedure.

#### Weed Bibliography Issued

A complete bibliography of weed investigations for 1950 has been prepared by the U. S. Department of Agriculture, Bureau of Plant Industry, Soils and Agricultural Engineering, Roy L. Lovvorn, Division of Weed Investigations, has announced.

The volume is the first attempt by the division to list the numerous publications in the field of weed investigations, mainly, those appearing in 1950. It is planned to publish future issues on a quarterly basis, it is stated. The bibliography is to be available without cost to anyone requesting it. Whether this practice will be continued depends upon future appropriations. Regional newsletters prepared by the Division will no longer contain their bibliography sections, it was announced.

Contents of the bibliography are divided into a chapter on the economic aspects and general weed problems; the botany of weeds, weed control through cultural, chemical and biochemical investigations; special characteristics of weeds; nature and properties of chemicals used as herbicides; effect of herbicides on soils, livestock and humans; equipment, methods of application and herbicidal calculations; and legal aspects of weed control.

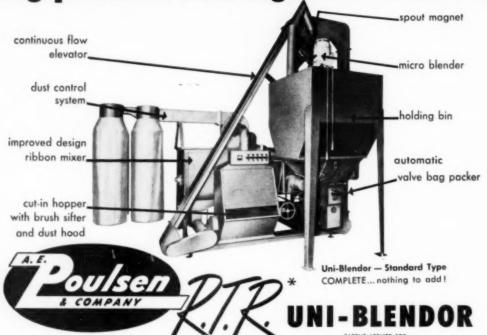
#### More Sulphur Prospecting

Freeport Sulphur Company has obtained the sulphur rights on a prospect at Nash Dome in Texas and will begin exploratory drilling there in the near future, Langbourne M. Williams, Jr., president has announced. The dome is located about thirty-five miles southwest of Houston, Texas.



## FOR ALL PROCESSES OF INSECTICIDE PRODUCTION

Big plant advantages AT SMALL PLANT COST



The R.T.R. UNI-BLENDOR incorporates all of the advantages of individually designed plants at materially lower cost. The units are designed by engineers who are recognized specialists upon insecticide processing equipment. A type is manufactured for each process of production.

#### R. T. R. UNI-BLENDOR - Standard Type . . .

Engineered to mix and blend dust concentrates with diluents to produce finished field-strength products of consistently uniform quality. Requiring only 9' x 12' of floor space and 13' of head room, the equipment can be readily and immediately installed in most existing buildings. The Uni-Blendor Standard Type produces up to four cu. ft. batches per hour.

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Designed for the same production process as the R.T.R. Uni-Blendor Standard Type, and producing up to seven 40 cu. ft. batches per hour, is provided for operations requiring quantity production.

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Engineered to perform a dual function the formulation of dust concentrates from technical grade toxicants and also the production of finished field-strength products.

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Each type of R.T.R. Uni-Blendor is a complete, compact, Ready to Run plant—nothing to add. Each unit is plant tested for maximum efficiency and shipped in sections which any mechanic can assemble.

The R.T.R. Uni-Blendor reduces the investment in equipment, eliminates the expense of remodeling buildings, avoids delays of installation, avoids disappointments in operation and production—all of which are frequently involved in specially designed equipment.

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#### Essay Contest Under Way

Entries were arriving at the offices of the California Fertilizer Association, sponsors of an essay contest dealing with fertilizer application as we went to press. The writing competition is among students of junior colleges of Southern California, on the theme of "Methods of Applying Fertilizer Materials in California," CFA reports a good response to the contest.

#### S Allocation Proposed

To halt a world-wide scramble for existing supplies of sulfur, a 10nation committee meeting in Washington in May, recommended allocation of the mineral as "a possible method of equitable distribution for the balance of 1951."

The 10-nation committee proposing the allocation was headed by Pierre E. Jaspar of Belgium. Other countries represented were Australia, Brazil, Canada, France, Italy, New Zealand, South Africa, the United Kingdom and the U. S.

It was indicated that the proposal excluded any possible allocation to communist countries. Available supplies, they said, will be divided not only among the 10 nations on the committee, but also non-member countries of the Western world.

Sulfur thus became the first strategic material to be recommended for international allocation since World War II ended. Details of the allocation plan were not revealed by press time.

#### Calspray Names Williams

California Spray-Chemical Corp. has announced the appointment of P. S. Williams as vice-president. The new appointee is a native of Colorado and a graduate of Stanford. He became a chemical engineer for Standard Oil Co. in 1921 and while still with S. O., began his association with Calspray through a survey of the latter's manufacturing and distribution facilities.

He developed the portable dust plants and originated the micro-mill pulverizing system by which Calspray processes new organic raw materials to finished agricultural dusts and sprays.

#### Carbide & Carbon Ups Two

Dr. George H. Law has been named director of research and Dr. Franklin Johnston as assistant director of Carbide & Carbon Chemicals Co., it has been announced by the company.

Dr. Law has been in research for the company since receiving his Ph.D from Yale in 1929, and has participated in the development of new insecticides, fungicides and herbicides as well as other chemicals in related fields.

Dr. Johnson is a graduate of the University of Missouri and Pennsylvania State College, and has specialized in organic chemistry with C ℰ C.

#### Discuss Fertilizer Grades

The annual meeting to consider grades of fertilizer to be recommended for sale in the states of Louisiana, Arkansas, Oklahoma, New Mexico and Texas next season, will be held at the Buccaneer Hotel, Galveston, Texas, July 19 and 20, it has been announced.

#### Ark. PCO Laws Enforced

The Arkansas Pest Control Association has voted to offer \$100 for information leading to the arrest and conviction of persons violating the state pest control licensing law. The State Plant Board has offered a similar reward of \$150. Applicants seeking to practice pest control in Arkansas must pass a written examination to obtain a license.

#### **New Hyman Laboratory**

A new plant pathology laboratory and greenhouse have recently been completed at Julius Hyman & Company's Rocky Mountain Arsenal plant, Denver, Colorado. They contain about 2500 square feet and adjoin the insecticide testing laboratory and insectary which were built and occupied about two years ago. This group of buildings is said to be one of the most modern and best equipped of its kind in the country. The work of the plant pathology laboratory is conducted by Dr. J. A. Pinckard.



#### Austrian Plant to Open

Bleiberger Bergwerksunion, has completed a nationalized sulfuric acid plant at Gailitz, Carinthia, according to the Government News Agency. The release stated that the plant will be able to produce 16,000 tons of sulfuric acid in its present state of completion and this will be boosted to 32,000 tons by the end of the year. The annual requirements of Austria range around 70,4

000 tons while her present production is about 7,000 tons.

#### BOOKS, BULLETINS AVAILABLE

A Digest of Information on Chlordane, by R. C. Roark, Division of Insecticide Investigations, United States Department of Agriculture. Number E-817, published April, 1951, 131 pages.

Commercial Fertilizers Report for

1990, by H. J. Fisher, chief chemist, Connecticut Agricultural Experiment Station, New Haven. Bulletin number 544, published December, 1990, 63 pages.

A Graphic Solution of Agricultural Field Sprayer Problems, by James E. Garton, assistant agricultural engineer, Oklahoma Agricultural Experiment Station, Stillwater, Miscellaneous Publication Number MP-19, published April, 1951, 4 pages.

Chemical Weed Control in Southern Africa. Witwaterstand University Press, proceedings of the First Southern African Weed Control Conference held at Frankenwald Field Station, University of the Witwaterstand, Johannesburg, October 23-25, 1950, 48 pages.

Brush Control Research, by Harry M. Elwell and Maurice B. Cox, Oklahoma Agricultural Experiment Station, Stillwater. Mimeographed Circular M-220, published April, 1951, 7 pages.

Controlling Perennial Ragweed to Make Better Pastures. by W. C. Elder, assistant Agronomist, Oklahoma Agricultural Experiment Station, Stillwater. Bulletin No. B-369, published April, 1951, 11 pages.

Ammonium Nitrate and Poultry Manure in Fertilization of Tobacco. by T. R. Swanback, Connecticut Agricultural Experiment Station, New Haven. Bulletin 546, published March, 1951, 26 pages.

Development of Insect Resistance to Insecticides — II. by Frank H. Babers and John J. Pratt, Jr., Division of Control Investigations, Bureau of Entomology and Plant Quarantine, United States Department of Agriculture. Number E-818, published May, 1951, 45 pages.

Progress Reports Numbers 1335, 1347, 1348, 1355, 1362, have been issued by Texas Agricultural Experiment Station, College Station, Texas, concerned with fertilizer and price yields in Texas.

A Graphic Solution of Airplane Sprayer Problems, by James E. Garton, assistant agricultural engineer, Oklahoma Agricultural Experiment Station, Stillwater. Miscellaneous Publication No. MP-20, published May, 1971, 4 pages.

Insecticide and Fungicide Issue, Official Report, Maryland Inspection and Regulatory Service, College Park, Md. Issue Number 218, published April, 1951, 95 pages.

#### Antara Grants Fellowship

Antara Products Division of General Dyestuff Corporation has announced the establishment at the Agricultural Experiment Station, Rutgers University, of a fellowship in the amount of \$4,000 for two years for a broad study of the function and effectiveness of the surface activity of surfactants in enhancing lethal power of herbicides.

# PICCO hi-solv 30



This highly refined aromatic petroleum naphtha combines high solvency with the ideal rate of evaporation for insecticides. Extensive use has shown Picco Hi-Solv 30 to be an excellent vehicle for insecticides such as DDT, chlorinated camphene and the like.

We will be glad to send complete data and samples for testing.



#### Tobacco Fumigation Info.

Connecticut Agricultural Experiment Station, New Haven, has issued Bulletin 542, "Fumigation of Tobacco Soils in the Seedbed and in the Field", by P. J. Anderson and T. R. Swanback. The booklet describes the application and action of methyl bromide, chloropicrin, formaldehyde and acetic acid; and discusses measurements of benefits derived from fumigation, effects of fumigation on the soil and on the cured tobacco and numerous suggestions about application procedures. Photographs accompany the written material to illustrate methods of usc.

#### Form New Consulting Firm

Robert N. Ward, executive secretary of the Washington State Aviation Association since 1948, has resigned to enter private business. He and Dr. Stuart W. Turner, former chemicals and agrology consultant for the W. S. A. A., have announced the formation of an aviation and cropdusting consulting service, with head-quarters at Boeing Field, Seattle. The firm will be known as Western Consulting and will handle the applications, chemicals, equipment, merchandizing and publicity problems of aerial sprayers and dusters.

#### Measuring Soil Phosphorus

Easily-soluble phosphorus (P) was determined in samples of soil from plots of a pasture experiment near Beaumont to which different amounts of rock phosphate and superphosphate had been applied.

The results showed a significant correlation between total forage yields and the quantities of P soluble in extraction solutions which were 1.0 normal with respect to sodium acetate, and 1.0 normal, 1.5 normal or 2.0 normal with respect to hydrochloric acid. When yield data for individual dates of harvest were used, significant correlation values were found with the 2.0 normal extracting solution.

One unit of P extracted by the 1.0 normal hydrochloric acid solution was found to be equivalent to 4.1 units extracted by the 1.5 normal solution and to 7.3 units extracted by the 2.0 normal solution. The greater spread in P extracted by the more acid solutions would be valuable in making fertilizer recommendations based on results of tests of soils which are low in P.

—Summary of Progress Report 1369, Texas A. & M. College, "Correlation of Forage Yields and Soluble Soil Phosphorus on Lake Charles Clay Loam".

#### DELANEY

(Continued from Page 57)

to enforce, or if a decision should involve tolerances for animal feed it would be turned over to the Department of Agriculture for enforcement.

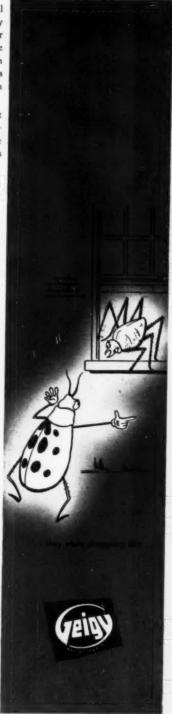
"The duties of the Advisory Committee would be to meet at regular intervals (probably quarterly) and at the call of the Commission, and bring before the Commission anything they wish pertaining to the production, the use, and the regulation of chemical or biological products in farming and the food industry. It would be their responsibility and duty to bring any complaint on the regulation set or about to be set by the Commission."

#### SYSTEMIC TESTED

(Continued from Page 75)

of octamethyl pyrophosphoramide be made on young, growing plants. Treatment of young rose plants should be started soon after they are set in the bench or even sooner. Treatment of older plants that are being cut back should be started when the new growth is elongating.

The foliage remains toxic for 2 to 4 weeks or longer following two to four applications of octamethyl pyrophosphoramide. Further applications at 2 to 4 weeks intervals are recommended to maintain the toxicity level necessary to control succeeding mite infestations.



## A Borate Mining Operation

## WEST BAKER MINE

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Run for your lives. Travel light. Leave everything behind. I've just gotten the word from the boys. They say the bugs down the road a piece never had a chance.

They were wiped out in their tracks by farmers

who swooped down on 'em armed to the teeth. They're all using Geigy's dusts and sprays—the most potent pesticides you bugs have ever seen.

Well, so long, boys. See you sometime, somewhere, maybe.

Aldrin Arsenicals BHC—DDT—Sulphur Carbamates Chlordane Copper fungicides DDT compositions Dieldrin Fumigants Lindane Methoxychlor Parathion PCP compositions Purified DDT Pyrethrum Rotenone

Tepp Toxaphene 2,4-D & 2,4,5 TCA

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Dealer & Distributor Inquiries Invited

### (Table continued from page 37)

#### Consumption of Plant Nutrients, by States and Regions, Your Ended June 30, 19502

#### Tons

				To	9.0					
State & Region Bits	In Mixtures    Bitrores   Phosphoria Oxide   Potash   Total			In All Fertiliser			re I Potash	Total		
	Hitrogen	Phosphor	Total	Potash	N. A.P208	Hitrogen	Amileble2/	?utal	Potesh	N, A.P.O
Wrine	11,650	22,515	23,100	26,107	60,280	12,118	28,026	26,600	26,138	64,28
New Hampshire	625	2,187	2,270	2,137	4,949	788	4,392	4,575	2,260	7,44
Vermont Massachusetts	975 3,633	6,774	4,799 7,203	6,284	10,279	1,088	11,116 9,195	9,817	4,873 6,670	17,07 20,38
Shode Island	718	1,468	1,534	1,561	3,747	816	1,941	2,025	1,627	4,38
Commenticut	3,002	4,968	8,322	4,942	12,912	4,502	8,017	8,579	6,524	19,04
New England	20,611	42,591	44,317	45,656	108,868	23,838	60,686	63,329	48,092	132,61
New York	20,749	47,918	49,851	33,574	102,141	23,913	61,888	85,383	34,063	139,85
New Jersey Peansylvania	19,281	22,838 64,399	23,623 67,733	40,879	124,859	20,611	25,169 83,820	26,084	20,844	57,12 145,76
Delaware	1,846	6,256	6,597	4,757	12,879	2,151	8,657	7,028	4,770	13,58
District of Columbia	80	127	142	126	333	109	172	186	133	41
Maryland West Virginia	7,957	25,590	27,168	17,351 4,431	50,898	8,921	30,256 17,542	32,071 18,553	17,474	56,68 24,26
	-	7,610	8,198		13,972			258,147	123,063	437,63
Widdle Atlantic	61,732	174,638	183,290	121,249	357,619	69,065	245,504		-	
Virginia Morth Carolina	18,060	63,432 337,600	67,803	45,565 104,208	127,067	26,522 93,873	83,391 149,461	180,493	110,100	155,88
South Carolina	23,161	60,545	85,408	43,495	127,201	\$2,770	78,744	81,358	60,793	179,30
Georgia	36,388	78,609	85,503	55,421	169,415	60,117	99,998	107,781	60,937	221,06
Florida	35,406	57,186	63,366	56,953	149,545	42,110	61,899	71,780	62,732	166,74
South Atlantic	161,429	397,372	430,249	305,642	864,443	275,392	470,493	509,672	330,529	1,076,41
Oháo	25,600	107,770	114,254	80,170	211,540	27,622	115,358	124,570	80,383	223,36
Indiana	19,000	88,989	94,775	80,364	188,353	26,365	97,290	113,772	81,408	130,48
Illinois Michigan	10,104	39,135 56,865	41,783 61,282	39,281 41,895	109,200	18,278	68,403	198,506 71,876	49,584 42,198	122,07
Wisconsin	8,100	47,316	50,607	43,918	99,334	10,767	52,811	59,240	44,967	108,54
East North Central	71,244	\$40,075	362,699	285,628	696,947	94,509	396,482	567,966	298,540	789,53
Winnegota	4,306	27,445	28,961	10,049	50,600	5,853	48,198	49,377	16,981	71,03
Ioun	7,176	28,859	31,884	14,270	50,305	13,765	82,996	63,998	15,059	81,81
Missouri North Dakota	9,531	35,278 2,838	38,106	1,205	66,526	18,686	49,426 5,116	74,253 5,394	1,206	91,26
South Dakota	156	420	485	35	591	335	1.033	1,189	35	1,40
Hebraska Sansas	784	1,967	2,044	138	2,889	8,578	5,286	5,676	193	14,05
West North Central	3,063 25,430	104,791	8,358	1,286	12,333	11,991	32,575	240,801	1,324	45,89 312,39
Kestucky		35,982	41,769	28,661					30,497	123,14
Tennessee	13,051	34,722	38,676	24,053	77,694	20,566	72,085 61,063	86,276	26,170	113,18
Alabama	32,003	73,732	82,721	50,130	155,865	59,236	108,177	120,417	83,845	220,98
Kississippi	16,001	26,248	29,487	16,934	50,183	87,112	47,226	52,691	24,996	159,33
East South Central	72,672	170,684	192,683	119,778	363,134	192,877	286,541	326,160	135,208	616,62
Arkeness	7,260	15,018	15,442	14,857	37,136	33,728	30,866	31,762	20,485	85,01
Louisiana Okiahoma	7,869	16,410	16,845	9,824	34,123	29,363	18,854	27,370	12,434	66,06
Texas	2,645	7,226	7,662	13,465	12,595 53,721	4,262	87,044	28,408 95,236	2,866	25,98 128,32
West South Central	28,994	67,710	70,938	40,870	137,574	94,680	161,046	182,776	49,733	306,45
Wontana	203	416	458	48	867	267	3,960	4,261	50	4,26
Idaho	739	1,106	1,195	196	2,041	3,824	9,568	9,956	232	13,62
Wyoming Colorado	1,672	330	3,432	1,021	5,996	285	1,063	1,921	50	2,17
New Marico	47	92	3,432	36	175	3,416	9,048 4,781	9,299	1,282	13,74
Arizona	1,005	2,000	2,805	265	4,728	10,245	7,010	7,256	467	17,72
Utah	204	359	369	64	627	1,461	2,831	3,060	90	4,37
Ireveda	2.5	46	47	11	82	26	224	236	12	26
Fountain	4,840	8,310	8,750	1,687	14,837	22,125	39,275	40,832	2,244	63,64
Washington	1,638	2,977	3,226	2,547	7,162	7,697	9,047	10,411	4,147	20,89
Oregon California	1,807	3,496	3,726 17,251	2,273 6,791	7,676	11,778	11,924 54,247	12,572 -56,354	3,389	27,09
Pacific	20,057	22,842	24,202	13,611	56,510					173,10
Continental U. S.	467,009	1,329,013	1,429,917	991,621	2,787,643	123,351	1,929,875	79,337	22,514	221,08
Hawali	4,662	3,196	3,385	6,149	14,006	955,639	7,556	2,269,020	1,069,890	3,955,40
Puerto Rico	23,689	13,703	14,457	22,035	59,427	29,401	13,964	7,987	12,728	40,69
Territories	28,351	16,899	17,842	28,183	73,433	49,813	21,510	22,702	34,802	106,12
Total: 1949-50	495,360	1,345,912	1,447,759	1,019,804	2,861,076	1,006,452	1,951,385	2,291,722	1,104,692	4,061,52
1948-49	512,474	1,384,669	1,500,030	999,035	2,896,178	919,946	1,941,709	2,289,631	1,073,073	3,934,72
1997-48	493,281	1,307,691	1,397,699	872,899	2,673,871	856,719	1,863,639	2,189,892	920,725	3,631,08

<sup>1/</sup> Includes Government distribution.

<sup>2/</sup> Includes 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.

Treatments may be in the form of aerosols, foliage sprays, or soil applications. Recommendations call for applying an aerosol containing 5 percent of technical octamethyl pyrophosphoramide at the rate of 1 pound per 50,000 cubic feet of space. Three applications at 2-week intervals will give good control, but applications should be continued to maintain toxicity in the plants. Aerosol applications should be made at temperatures of 70° to 85° F., and the ventilators should be closed for 1 to 2 hours to allow the aerosol to settle on the plants. Sprays containing 1 part of technical octamethyl pyrophosphoramide to 1,000 parts of water, plus a wetting agent, applied as a mist over the top of the foliage, are also recommended. These give good control of mites, but cause some yellowing of old leaves on some varieties of roses. Spray applications should be repeated in 1 week if the foliage is hard or injured by mites. Soil treatment of potted roses, lillies, and other plants may be useful under certain conditions. One application of 1 part of technical octamethyl pyrophosphoramide to 2,400 parts of water is recommended for soil treatment. A minimum amount of the material should be applied, according to the volume of soil and the size of the pot.

Smith and Fulton point out that octamethyl pyrophosphoramide is somewhat more toxic than parathion to warm-blooded animals, and must be handled with great care. They recommend its use only by experienced greenhouse operators who understand the dangers and will take the precautions necessary to safeguard themselves and their employees. They point out that it should not be used on any vegetable crops intended as food. Its chief value is for the control of resistant mites on roses and a few other ornamental crops, also for aphids on certain ornamentals.

#### INSECT CONTROL

(Continued from Page 67)

in Maryland and Louisiana, with lighter populations reported from South Carolina. About 150 acres of late peas were heavily infested by the pea aphid in Ventura County, California the first week in May. By the middle of May this insect was moving from alfalfa, clover, and vetch to peas in Delaware, with some heavy infestations reported on the latter crop. Light infestations were reported on peas in Maryland. This aphid continued to move from alfalfa to peas in the Blue Mountain district of

Washington-Oregon during the first half of May. By the middle of the month infestations were heavier on peas there than during a comparable period in the previous three years. Heavy infestations on vetch in western Washington and Oregon were moving to peas at that time.

Aphid infestations on tobacco were reported as scattered and generally light in Georgia and Florida during the first half of May.\*\*

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Now there's BHC from Tennessee to cope with the menace. Losses from the boll weevil can be made trivial. Dust and sprays with the gamma isomer of BHC can knock out the offensive insect before he has a chance to attack.

You may not need Benzene Hexachloride to beat the bug, but chances are you'll benefit from a product or chemical from Tennessee—an industry that serves all industry.

#### Baker to Seacoast Labs.

Seacoast Laboratories, Inc., New York, announced recently the appointment of Irvin Baker as vice-president in charge of sales. For the past four years, Mr. Baker was associated with the insecticide sales department of General Chemical Division, New York. He is a graduate of Rutgers University, with varied experience in the agricultural field. He will take active charge of the Insecticide and Fungicide Division of Seacoast Laboratories, Inc.

#### NFA MEETING

(Continued from Page 43)

Potash Company of America, New York; C. J. Ball, Phillips Chemical Company, Norfolk, Virginia; Ralph Boynton, United States Potash Company, Atlanta, Georgia; Leroy Donald, Lion Oil Company, El Dorado, Arkansas; E. A. Geoghegan, Southern Cotton Oil Company, New Orleans, Louisiana; Beverly H. Jones, Sunland Industries, Inc., Fresno, California; A. D. Kincaid, Southern Cotton Oil Company, Columbia, South Carolina; E. M. Kolb, American Potash & Chemical Corp., New York; H. B. Mann, American Potash Institute, Washington 6, D. C.; A. F. Miller, Swift & Co., Plant Food Division, Chicago, W. R. Morgan, International Minerals & Chemical Corp., Chicago, J. R. Riley, Jr., Spencer Chemical Company, Kansas City, Missouri; Trenton Tunnell, Ashcraft · Wilkinson Company, Atlanta, Georgia; Gene Van Deren, Bluegrass Plant Foods, Inc., Cynthiana, Kentucky; and Albert Woods, Potash Company of America, Raleigh, North Carolina.

#### LISTENING POST

(Continued from Page 65)

1059" in concentrations of .03, 0.25, 0.5, 1, and 2%. Each treatment was replicated six times, three pots receiving one application and three pots receiving a second application after one week. At the end of one week, the soil in the pots receiving one ap-

plication was loosened and potato seed pieces were planted. The same procedure was followed one week later for those pots receiving two applications.

Only 40 percent of the seed pieces germinated in soil receiving one application and 6 percent in soil receiving two applications. Top growth of those which did germinate was poor and tuber weights were inversely proportional to the concentration of the drench. No reduction in the

number of new cysts formed was

#### Vs Root-knot Nematode

SINCE root-knot nematodes do not form cysts and the soft-bodied females deposit their eggs in a muscoid mass, the eggs and larvae would appear to be more vulnerable than those of the golden nematode; so an experiment was set up to test the effect of "E-1059" on root-knot nematodes when used as a soil drench.

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UNITED STATES STEEL

Clean soil was placed in fourinch pots and each pot inoculated with 6 grams of root-knot inoculum. The pots were drenched with "E-1059" solutions in concentrations of .03, 0.25, 0.5, 1, and 2%. After one week, soil from each pot was mixed with enough additional nematodefree soil to fill three pots. Tomato seedlings were planted in all pots. Inoculated controls that received no drench treatment were included.

At the higher concentrations, the chemical proved very phytotoxic, killing some of the tomato seedlings. Even at the lowest concentration, considerable injury was evident. Plants that did not grow showed no signs of root-knot infection while the checks were severely galled.

In another experiment, spraying the foliage of tomato and tobacco seedlings growing in infested soil with concentrations of "E-1059" up to 1% either once a week or twice a week did not control root knot. At the 1% concentration, burning and curling of the leaves of sprayed plants was observed.

#### Conclusions

ARVAL migration from golden nematode cysts treated in the laboratory was inhibited at all concentrations of "E-1059" tested and hatched larvae were killed when exposed to various concentrations of "E-1059" in vitro. Seed pieces soaked in various concentrations germinated poorly. The chemical was toxic to plants sprayed with a 1% concentration. Soil drench tests resulted in a low percentage of germination of potato seed pieces and poor top growth for seed pieces that did germinate. Nematode infection was not reduced in any of these experiments.

Soil drench tests "with "E-1059" for the control of root-knot nematodes resulted in good control with concentrations as low as .03% but tomato seedlings planted one week after treatment were injured.

#### STATE LAWS

(Continued from Page 45)

Federal Food, Drug and Cosmetic Act, providing that "No person shall introduce or deliver for introduction into interstate commerce, any chemical additive as defined in Sec. 20 (q) unless an application filed by such person pursuant to subsection (b) is effective with respect to such chemical additive."

The necessity for regulatory control of the sale and use of insecticides, fungicides and other so-called "economic poisons" is recognized by all, but with the present multiplicity of laws and regulations to which the industry is subjected, it imposes a material hardship and expense on the manufacturers of these products and added cost to the users. \*\*

#### GUEST EDITORIAL

(Continued from Page 30)

for additional materials and knowledge on the formulation and use of insecticides. This, of course, contemplates more information on equipment and methods of applying insecticides. It also points up the need for more research on methods of analysis, toxicology, and antidotes in

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case of accidental poisonings.

Insect surveys in which state and federal entomologists have cooperated have aided industry by supplying timely information on the distribution and abundance of destructive species. Present-day conditions place stress on crop production and protection while at the same time presenting the problem of conserving available insecticides. There is reason to expect heavy insecticide applications over large areas. Wise use of insecticides will save crops, land, and labor and wise use of materials presupposes accurate knowledge of insect conditions that may threaten economic crops. The Bureau has taken steps to strengthen cooperative insect surveys. Every entomologist in the country can contribute and the resulting increased efficiency in agricultural production is a worthwhile objective.

Hand in hand with wise use of insecticides goes the need for employment of other means of pest control. Mechanical, cultural, and biological control and the development of resistant crop varieties are important supplements to the use of insecticides and their employment tends to give more effective control and reduce hazards from residues. There is much evidence to indicate that cultural methods for insect control can extend chemical supplies and maintain production levels. It is believed that efforts to make use of biological control may pay dividends. Examples of the effectiveness of this type of control in this country are striking but all too few. Results in this field of research sometimes come slowly and they may be obtained at times only at the expense of considerable effort but to lose sight of the place of cultural and biological control in the picture is to commit ourselves to a program which may be one-sided and not fully comprehensive.

Finally, it should be emphasized that recommendations of any insecticide for use in the protection of food products from insects should not be made until it has been determined that residues are not present in harmful amounts. Also no insecticide should be placed on the market until adequate testing has shown that the product can be used safely for the purposes for which it is intended. Problems of this nature are the joint responsibility of government and industry. Much progress has been made during the past few years in insect control but even more rapid progress may be expected in the future by still clover cooperation.

#### TOXICITY HAZARDS

(Continued from page 53)

chiefly from the standpoint of poisonous chemical residues on foodstuffs. They are charged with the enforcement of an act known as The Federal Food, Drug, and Cosmetic Act, which was approved June 25, 1938, (No. 717-Seventy-fifth Congress, Chapter 675, Third Session) and which repealed and replaced the



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Food and Drugs Act of June 30,

The present F. D. and C. act empowers the Administrator of the Federal Security Agency to issue orders or regulations for the proper execution of the act. Shortly after these orders are published in the Federal Register, they become effective. This is the prodecure followed for the establishment of tolerances of poisons on foodstuffs.

Section 301 states that the following acts and their causes are prohibited: the adulteration or misbranding of any food, drug, device, or cosmetic in interstate commerce. Section 402 states that a food shall be deemed to be adulterated, if it bears or contains any poisonous or deleterious substance which is unsafe within the meaning of section 406.

Section 406 states that any poisonous or deleterious substance added to any food, except where such substance is required in the production thereof or cannot be avoided by good manufacturing practile shall be deemed to be unsafe for purpose of the application of clause 2 (above) of section 402; but when such substance is so required or cannot be so avoided, the Administrator shall promulgate regulations limiting the quantity therein to such extent as he finds necessary for the protection of public health, and any quantity exceeding the limits so fixed shall also be unsafe for purposes of the application of clause 2 of section 402 (given above). It is a legal requirement that public hearings be held on tolerances, before they are legally binding.

Finally, the act sets up procedures for seizure and condemnation of contaminated foods, and for fines and inprisonment for any person who violates the provisions of the

### Prevention of Residues

HE grower is concerned chiefly with toxic residues on his produce, and public health laws which pertain to his employees. The Federal Food and Drug Administration has established few legal tolerances for toxicants on foodstuffs. Other than these tolerated materials, it is unlawful to market produce with any poison on it. It is generally possible to avoid toxic residue on the fruit, or other produce, at harvest time: (1) by using materials which are non-toxic to man: (2) using volatile materials; (3) using unstable chemicals which decompose quickly into non-toxic degradation products; (4) spraying before the fruit is present; or (5) in many cases, not spraying within a specified harvest time.

If, however, the produce is harvested with an illegal toxic residue on it, then it must be processed to remove the residue. The simplest process consists of washing with water. Occasionally, as in the case of light deposits of arsenic on apples. dry wiping may reduce the residue to within the legal tolerance. In more difficult cases of residue removal, chemical baths have been used, containing acid, or basic, or detergent

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solutions. The organic residues are not removed readily by any washing process. The above methods apply primarily to the arsenic type compounds.

The laws which pertain to the health and welfare of the men employed on the farm are promulgated by various state and county agencies. These are known in the various states under various names such as the State Department of Adult Health, State Department of Industrial Welfare, etc. These laws may describe safety appliances which must be furnished to employees who handle and apply hazardous chemicals. Such appliances may be goggles, respirators, protective clothing, etc. In some instances, local county ordinances are designed to control drift to adjacent properties, to protect bees, to provide for the safe disposal of used containers of hazardous chemicals, etc. Such county ordinances are enfored, usually, by the County Agricultural Commissioner. Growers and custom sprayers should consult this official for information on such laws and their amendments.

### Miscellaneous Hazards

ANY states now license pest control operators; operating as a commercial pest control operator without a license is illegal in those states.

Operators should be cautious of climbing into spray tanks to clean the tank or repair the agitator blades, since the tank may contain poisonous fumes.

After using 2,4-D, and before using the rig to spray fungicides or insecticides onto crop plants, the rig must be washed thoroughly. Otherwise, the minute quantities of 2,4-D remaining in the tank may be sufficient to produce serious damage to the crop. It has been shown that even after rinsing hand-spraying equipment with several changes of hot water, enough 2,4-D remains to injure tomato plants. Consequently, if water-soluble 2,4-D compounds have been used, the rig should be scrubbed with hot soap suds and rinsed with abundant cold water. A solution of trisodium phosphate, one pound in

25 gallons of water, is probably more effective than soap. Another method consists of soaking the tank and pump overnight with plain water, then draining and running a lye solution through the machine the next morn-

If oil-soluble 2.4-D compounds have been used, rinse the tank first with kerosene. Follow with a rinse of lve or washing soda solution, two pounds in 25 gallons of water. Leave the solution in the tank for about

five minutes. Rinse several times with water, preferably hot.

A better answer to this problem is to use a sprayer exclusively for the application of 2,4-D and apply other chemicals with another sprayer.

Most of the seed disinfectants, as well as the insecticide, lindane, when applied to seeds in the dry, dust form are irritating to the respiratory tract of the operator. Artificial ventilation or a cyclone separator should

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Most treated seed is poisonous, and bags of treated seed should be marked clearly so that they will not be fed inadvertently to poultry, pets, or livestock, or used for food.

# TCA HERBICIDES

(Continued from page 50)

of frequent watering. In the fall the pots were never dry. Possibly some downward movement through the transpiration stream occurs when roots are deficient in moisture as has been demonstrated to occur with acid-arsenical sprays on certain species. (7)

Subsequent tests with kidney beans, dipping only the primary leaves in sodium TCA solutions, gave no indications of a systemic TCA response. With soybeans there was evidence of some absorption and transport from primary leaves to shoots in one test and no such evidence in the other. When it did occur the response of the shoot growth was very slight. These tests with beans indicate further that foliar absorption and transport is relatively unimportant as far as the systemic effect is concerned.

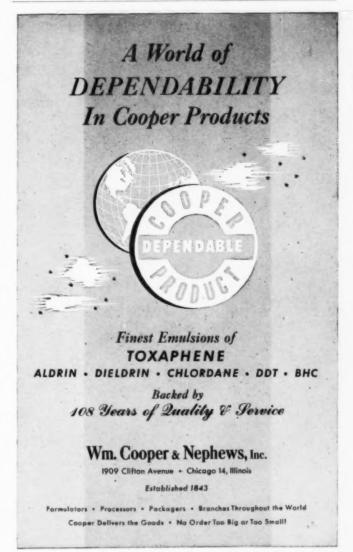
When oil solutions of parent TCA and oil solutions of esters of TCA were applied to Johnson grasss stems with a pipette bud, inhibition was observed. No solution was allowed to reach the soil directly and subsequent watering was done in such a way that the stems were not washed off. In this instance the oil probably carried the TCA to the growing points of the grass by creeping through the plant tissues. The possibilities of utilizing oil as a carrier in order to gain more direct access to grass buds needs further investigation.

### Fate of TCA in Soil

Limited leaching tests agreed with the results of Loustalot and Ferrer (9). Using the pyridine test on the leachate from columns, we have learned that TCA is rather readily leached from soils. The rate of leaching and the extent of retention at different levels was observed to vary considerably with soil properties. We have established nothing new on this subject except to con-

vince ourselves of the usefulness of the pyridine test.

In tests in soil where leaching was avoided, the rate of loss was studied using wheat as a biological test as well as the pyridine test. Results were in substantial agreement with those of Loustalot and Fererer (9). TCA was found to become inactivated with time. Rate of inactivation was greater in a composted soil high in organic matter, than in a low organic matter field



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soil. Results suggest that micro-organisms may be responsible for this inactivation.

### Fate of TCA in the Plant

SING the pyridine test, we have examined the expressed sap of roots and of top growth of plants growing in sodium TCA treated soil. When a color developed in the test tubes it was assumed to be as a result of TCA in the sap. However, it could conceivably be some decomposition product. The following observations have been made.

- Sap of young bean and corn plants growing in soil treated with 20 pounds per acre of sodium TCA and showing marked morphological response contained very little TCA. At 10 pounds per acre there was not a trace of TCA in the corn sap and very little in the bean sap.
- Sap of peas, a tolerant species, growing in similarly treated soil contained a relatively high concentration of TCA.
   A positive test for the presence of TCA was also obtained with sap of radish leaves from plants growing in treated soil.
- Root sap of corn, beans and peas showed a similar trend with only a trace of TCA in corn and beans and a considerable concentration in peas at 20 pounds per acre.
- The rate of loss of TCA from the soil was greater in pots in which plants were growing than in bare soil. Peas (TCA tolerant) appeared to deplete soil at the same rate as corn and beans (susceptible).

From these limited results, it appears likely that TCA is absorbed by both tolerant and susceptible species. The tolerant species tested did not appear to utilize TCA in their metabolic processes while the susceptible species may have metabolized it in some maner and growth reduction and other morphological response resulted.

These results have practical as well as theoretical implications. They may explain in part the superior quack and blue grass kills that have been repeatedly obtained when freshly plowed sod was sprayed. Possibly grass top growth on unplowed land used up enough TCA from the soil to reduce materially the amount available for a prolonged effect on roots and buds.

Superior kill of Johnson grass has been reported by several workers from spraying in the dormant season. This may be due to slower depletion of TCA by plant tissue because of the lack of foliage or to lowered metabolic activity of dormant parts. Excellent results have been obtained with combination sprays containing sodium TCA and a phenolic contact herbicide. Possibly the rapid kill of foliage from the phenolic herbicides reduces the extent of foliar removal of TCA and more is retained in the soil where it can act on grass roots and growing points.

These results also raise the question as to whether weeds on land to which sodium TCA is applied for perennial grass control will remove from the soil sufficient TCA to decrease grass kill. Certainly vegetation other than the grass being controlled should not be ignored. Occasional tillage subsequent to TCA treatment would appear to be desirable.

It was interesting to note that the magenta color did not develop quickly when using the pyridine test on the sap of pea or radish top growth. When running soil tests or tests with pea root sap the color developed while the test tubes were in the

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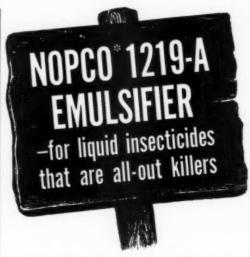
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NOPCO CHEMICAL COMPANY Harrison . . . . New Jersey boiling water bath. It took an hour or more for maximum color development with pea foliage sap, and several hours with radish sap. Possibly the TCA is loosely held on a protein complex present in foliage and is gradually released.

What happens to the TCA that is absorbed by foliage following spraying in quantities sufficient to cause a contact or burning effect? It appears probable that it reacts with the protoplasm in some way and thus is no longer available for entry through the roots. Field observations on the use of parent TCA in oil, which gives a greater degree of foliage burn than sodium TCA in water, indicate this is the case.

## Carbohydrate Reserve Relationships

B LUE grass on frequently-mowed turf was observed to be more easily killed with sodium TCA than on undisturbed sod even when the latter was mowed just prior to spraying. In one series of tests grass that had been disked twice at three week intervals before spraying showed less re-growth following treatment with various rates of sodium TCA than similarly treated but undisturbed grass. Although not always confirmed in subsequent tests, these observations suggest a relationship between a high degree of grass kill and a low level of carbohydrate reserves.

An examination at the end of the two month period showed more dormant but apparently visible buds on the rhizomes from the undisturbed sod than on those from the disked sod. These results suggest the desirability of further physiological studies and also field tests on grass frequently disked or closely grazed or mowed for some time before spraying to reduce carbohydrate reserves. Possibility of carbohydrate depletion by nitrogen fertilization should be investigated.

## Investigations of Derivatives of TCA

VARIOUS organic and inorganic salts of TCA are being tested for phytotoxicity using quack grass and wheat as test plants. In these

particular tests no differences in systemic effect have been observed among those salts investigated thus far. The rate of leaching of certain low-soluble organic salts was found to differ little from that of the so-dium salt.

Among the inorganic derivatives of TCA, the calcium salt appears worthy of further investigation because of certain desirable physical properties. Contrary to the results of Raleigh (10) we have not found calcium TCA to be more phytotoxic than sodium TCA.

Several alkyl esters have given inferior results in certain tests on quack grass. In other tests, their effect was comparable with that of sodium TCA. These derivatives have a relatively high vapor pressure and under some conditions they probably volatilize rather quickly. Certain esters of higher alcohols which



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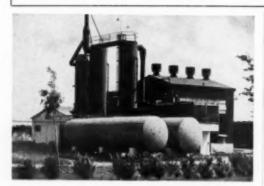
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have relatively low vapor pressures, have given grass control equal to sodium TCA.

# Crop Tolerance to TCA

ANY observations have been M made by workers in the field on the relative tolerance of various crops to sodium TCA. The use of 10 pounds per acre for control of annual grasses is now a recommended practice with sugar beets. Other crops appeared tolerant in plot tests by various workers and extensive field trials are indicated. In order to extend our information regarding crops that will tolerate soil residues of TCA a large number of species were tested in the greenhouse where variations in soil moisture could be controlled. These results have recently been reported in detail (3).

Among the tolerant plants were cabbage and many other vegetables that are members of the Cruciferae; also carrots, celery, parasnips, tomato, pepper, eggplant, tobacco, beet, flax, pea and vetch.

The intermediate group included several of the Cucurbitaceae, spinach, cotton, asparagus, potato, onion, sweet potato, strawberry, alfalfa, Ladino clover, peanut, and gladiolus. Oat was the only member of the grass family in the tests that fell in the intermediate group.

A rating of susceptible was assigned to the fifteen more common Gramineous crops included in the test. Beans, soybeans, lima beans, sweet clover, alsike clover, crimson clover, red clover, blue lupine and Korean lespedeza were also classified as susceptible.

These greenhouse results should not form the basis for farm recommendations. Rather they suggest fruitful lines of field investigation.

To test this hypothesis, rhizomes were dug from an undisturbed sod and also from one which had been given a shallow disking at intervals to destroy new foliage. This treatment presumably lowered the carbohydrate reserves. Triplicate flats planted with equal weights of rhizomes from disked and undisked sod were treated with 0, 10, and 40

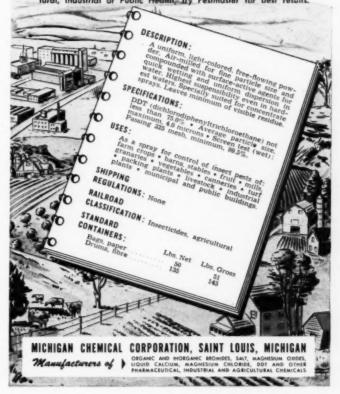
pounds per acre of sodium TCA. The relative grass shoot development at the end of two months from the rhizomes from the two sources is indicated in Table 1.

It is possible that under field conditions, plants in the tolerant group and some in the intermediate group will tolerate rates of sodium TCA adequate for the control of certain annual grasses. Certainly plants in the susceptible group should not be planted where a TCA residue

Many plants appear more tolerant to sodium TCA after they become well established than they do in the seedling stage. This may be because of considerable root development below the toxic layer of soil or it may result from the development of greater physiological tolerance with age. Possibly application to established plantings to control



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late-emerging grasses would be worth trying with crops in the intermediate as well as the tolerant group. It might also be worthwhile to test the reaction of established plants of the more tolerant species at rates adequate for the control of perennial grasses. These approaches have given encouraging results in the control of annual and perennial grass weeds in alfalfa and asparagus.

### Summary

- A simple chemical test for TCA (trichloroacetic acid) was developed using pyridine and sodium hydroxide as reagents.
- Several biological test methods for soil residues of TCA were used. Wheat and soybeans gave response at low rates and made rough quantitative estimations possible.
- The occurrence of two physiologic responses: (a) foliar contact and (b) systemic, were experimentally established. Various symptoms of the systemic effect are described.
- Absorption by underground parts was established as being the primary avenue of entry of TCA for the plants tested.
- Leaching and decomposition were both found to be possible factors in the disappearance of TCA from soils.
- 6. Analysis of soils and plant sap indicated that there is uptake of TCA by both tolerant and susceptible species which will result in a lowered TCA content of the soil. Tolerant species had a relatively high TCA content in the sap and susceptible species a low content indicating that the latter utilize TCA in their metabolism.
- In certain tests TCA had a greater effect on grass low in carbohydrate reserves than on grass higher in carbohydrates.
- 8. Various salts of TCA and esters of TCA having low vapor pressures were found equal to sodium TCA in systemic effect on certain grasses. Esters having a relatively high vapor pressure

- were inferior apparently because of loss from volatilization.
- A wide variation in the relative tolerance of crops was found.
   Tolerant, intermediate and susceptible crops are listed.

### References

- Anonymous, Down to Earth, 5, (No. 2) p. 6 (1949)
- Barrons, Down to Earth, 4. (No. 4)
   p. 8 (1949)
- 3. Barrons, Down to Earth, 6, (No. 4) p. 8 (1951)

- Barrons, and Watson, North Central Weed Control Conf. Research Report (1949) p. 43
- 5. Barrett, J. Ind. Hyg. Toxicol., 18, 341 (1936)
- Carder, North Central Weed Control Conf. Research Report (1950) p. 10
   Crafts, Hilgardia I, 361 (1933)
- 8. Friesen, North Central Weed Control Conf. Research Report (1950) p. 12
- 9. Loustalot and Ferrer, Agronomy J. 42, 323 (1950)
- Raleigh, Proc. Fifth Northeastern Weed Control Conf. 5, 185 (1951)
- Ross J. Biol. Chem. 58, 641 (1923)
   Watson, North Central Weed Control Conf. Research Report (1950) p. 16

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# Fertilizer Advisory Committee Meets



Seated (Lto R): J. S. Fields, safety director. Phillips Chemical Co. Bartlesville. Okla.: A. B. Pettit, supervisor, Industrial Health and Safety. Davison Chemical Corp.. Baltimore: Miss Helen V. C'Hara secretary to Mr. Patti

V. O'Hara, secretary to Mr. Pettit. Standing (L to R): W. P. Stanshury, supervisor of production, mixed fertilizer division, Davison Chemical Corp.: Dr. M. H. McVickar, chief agronomist. National Fertilizer Association. Washington. D. C., Paul T. Truitt, president. American Plant Food Council, Washington: H. R. Krueger, director of technical service. Phillips Chemical Co.; J. M. Sisson, safety officer, Tennessee Valley Authority, Wilson Dam. Ala.; and M. F. Wharton, secretary-treasurer, Arizona Fertilizers Inc., Phoenix, Ariz.

Safety Committee Formed

The advisory committee of a newly-formed fertilizer section of the National Safety Council held its first meeting in Baltimore, May 16. Under the chairmanship of A. B. Pettit, supervisor of industrial health and safety of the Davison Chemical Corp., the group formulated plans for a fertilizer industry safety program, formal presentation of which will be made at the October 11th meeting of the National Safety Congress in Chicago.

Mr. Pettit pointed out that although there are more than 500 fertilizer plants in the United States, there has never . . . been any organized national effort to reduce the accident injuries occurring in the industry. He noted further that many other industries have cooperated to conduct special sessions for solution of specific problems, and these efforts have resulted in a reduction of both the number and severity of accidents as well as a decided decrease in industrial illness.

The fertilizer industry is being urged to send representatives to the coming meeting in Chicago, and the idea has backing of both the National Fertilizer Association and the American Plant Food Council, it was indicated.

# Western APS Meets

The Pacific Slope Division of the American Phytopathological Society was all set for its 33rd annual meeting scheduled to be held on the University of California campus at Los Angeles for three days, beginning June 19. The meeting was to be in conjunction with the Pacific Division of the AAAS.

According to Dr. George A. Zentmyer, secretary-treasurer of the Division, papers on plant pathology were to be presented on the opening day and the morning of June 20. A joint session on the 20th was also planned to discuss "Air Pollution and Plant Life", as was a demonstration session on various phases of plant pathology. The annual dinner was to be held on the evening of June 20.

Officers of the Pacific Division, in addition to Dr. Zentmyer, are: Earle C. Bladgett, Proseer, Washington, president; Wm. B. Hewitt, Davis, California, vice-president; and S. M. Dietz, Corvallis, Oregon, councilor.

Ag Building Dedicated

Formal dedication of Lipman Hall, Rutgers University College of Agriculture, was planned to be held on June 12. Completion of the building coincides with the 50th anniversary of the appointment of Dr. Jacob G. Lipman as soil chemist and bacteriologist at the Agricultural Experiment Station.

Dr. Lipman, who later became dean and director, is credited with outstanding leadership in bringing the New Jersey institution to its present prominence.

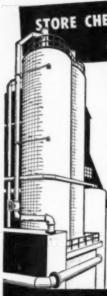
The building is constructed in Georgian Colonial tradition to harmonize with other permanent buildings on the campus.

New Legislation Noted

New legislation affecting the agricultural chemical trade is in the works on several fronts. In Utah, the recently enacted Utah Insecticide, Fungicide and Rodenticide Act of 1951 (effective July 1) is modeled after the Model State Act. It provides for registration fees of \$5 per brand, \$50 maximum; Option II ingredient statement labeling is permissible only on household products. Unregistered products are subject to quarantine; and there is no provision for registration under protest.

New Mexico has enacted a new law, also patterned after the Model State Act. It calls for registration fees of \$2 per brand with no maximum specified. There is no provision for registration under protest, although a hearing is provided before registration is refused. It is also stated that "No article shall be deemed in violation of the Act when prepared or packed according to the specifications or directions of purchaser." No registration date is specified in the Act.

The Florida legislature has under consideration a bill to impose a 50-cents-a-ton tax on phosphates and a 3% tax on the wholesale value of kraft paper. It had not been passed as this issue went to press.



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# **Industry Patents**

2,544,141. Weed Control. Patent Issued March 6, 1951 to John J. Don-leavy, Montclair, N.J., assignor to Allied Chemical and Dye Corporation, New York. The method of combatting weeds which comprises treating said weeds with an aqueous solution, comprising 2 to 11% by weight of material of the group consisting of fluoboric acid and the salts thereof, in amount sufficient to cause deterioration of said weeds.

2,545,176. Fungicidal Compositions Comprising N,N'-Bis (4-Nitrosophenyl) Piperazine. Patent issued March
13, 1951 to Miller W. Swaney and Samuel B. Lippincott, Westfield, N.J., assignors to Standard Oil Development Company, Elizabeth, N.J. A fungicidal composition comprising N,N'-bis (4-nitrosophenyl) piperazine as the active dispersing agent which lowers the surface tension of water and thereby promotes aqueous colloidal dispersions of the N,N'-bis
(4-nitrosophenyl) piperazine.

2,546,174. Insecticidal Composition Containing A Polychloro p-Methane. Patent Issued March 27, 1951 to William D. Stonecipher, Newark, Del., assignor to Hercules Powder Company, Wilmington, Del. An insecticidal composition comprising a polychloro p-methane containing from about 50 to 75% of chlorine and a hydrocarbon solvent therefor.

2,546,175. Insecticidal Composition Containing a Polychloro p-Methane. Patent issued March 27, 1951 to William D. Stonecipher, Newark, Del., assignor to Hercules Powder Company, Wilmington, Del. An insecticidal composition comprising a polychloro p-methane containing from about 50% to about 75% of Chlorine and a finely divided solid carrier.

2,546,176. Insecticidal Composition Containing a Polychloro p-Methane. Patent issued March 27, 1951 to William D. Stonecipher, Newark, Del., assignor to Hercules Powder Company, Wilmington, Del. An insecticidal composition comprising an aqueous dispersion of a polychloro p-methane containing from about 50% to about 75% of chlorine.

2,457,723. Chemicals and Fungicides. Patent issued April 3, 1951 to Norman K. Sundholm, Naugatuck, Conn., assignor to United States Rubber Company, New York, N.Y. A compound of the structural formula

where X is selected from the group consisting of O and NR in which R is a radical of the group consisting of alkyl, haloalkyl, cyanoalkyl and aralkyl radicals.

2,548,480. Fungicidal Compositions Containing Nitro-Methanal Phenyl Hydrazones. Patent issued April 10, 1951 to Allen R. Kittleson, Cranford, and Miller W. Swaney, Westfield, N.J., assignors to Standard Oil Development Corporation, Elizabeth, N. J. A fungicidal composition comprising a hydrazone selected from the group consisting of nitromethanal phenyl hydrazone and methanal p-dimethylamino phenyl hydrazone as the active ingredient admixed with a dispersing agent which lowers the surface tension of water and thereby promotes aqueous colloidal dispersions of the hydrazone.

2,548,509. Fungicidal Compositions Containing Hexachlorocyclopentadiene: Patent issued April 10, 1951 to
Howard L. Yowell, Westfield, N.J., assignor to Standard Oil Development Corporation, Elizabeth, N.J. A fungicidal
composition comprising hexachlorocyclopentadiene as the active ingredient admixed with a dispersing agent which
lowers the surface tension of water and
thereby promotes aqueous emulsions of
hexachlorocyclopentadiene.

# **Trade Mark Applications**

Carco, in outline capitals on curve with wide "X" underneath, for insecticide in liquid form. Filed Sept. 27, 1948 by Newville F. Rea, doing business as Getsum Products, Sumner, Wash. Claims use since June 17, 1948 on the mark as shown and since Jan. 15, 1914, on the word "Carco".

BEM BRAND FERTILIZER, in block capitals in a wide white circle, and within the white circle is the word Bem vertically and horizontally, the letter "B" common to both words, and outside the white circle is a wider black circle with a white line star, for superphosphate and mixed grades of commercial fertilizer. Filed April 25, 1950 by Thurston Chemical Company, Joplin, Mo. Claims use since April 29, 1948.

HURRY-UF PLANT FOOD, in capital letters on two lines, Hurry-up is centered above the words Plant Food, for condensed fish solubles used as a fertilizer. Filed April 14, 1950 by East Bay Fisheries, San Francisco. Claims use since March 28, 1950.

TRI "D", in capital letters, for insecticide. Filed June 14, 1949 by Stauffer Chemical Co., San Francisco. Claims use since May 14, 1948.

POLYBOR CHLORATE.in capital letters, for weed control preparation consisting of borax, sodium pentaborate, sodium chlorate, and a minor percentage of inert ingredients. Filed June 28, 1949 by Pacific Coast Borax Company, Los Angeles, Calif., assignor to Borax Consolidated, Ltd., London, England. Claims use since October 27, 1948.

COMPOUND 118, in bold face capitals, for insecticides. Filed January 18, 1950 by Julius Hyman & Co., Denver, Colo. Claims use since April 27, 1949.

LINDEX, in bold face capitals, for insecticides. Filed May 11, 1950 by Thompson-Hayward Chemical Co., Kansas Cit, Mo. Claims use since February 9, 1950.

Pyrin, in bold face capitals, for insecticide concentrate. Filed May 15, 1950 by John Powell & Co., New York. Claims use since June 9, 1938.

Shaded Rectangle for the colors yellow and black, for insecticides and fungicides. Filed September 22, 1947 by Stauffer Chemical Co., San Francisco, Calif. Claims use since February 28, 1939.

COMPOUND 497, in bold face capitals, for insecticides. Filed January 18, 1950 by Julius Hyman and Co., Denver, Colo. Claims use since April 28, 1949.

JET, in outline capitals shaded for third dimensional effect and with black lines to indicate movement, for insecticides. Filed May 2, 1950 by Airosol Company, Inc., Neodesha, Kansas. Claims use since March 11, 1947.

MILFUSO, in bold face capitals increasing in height to the letter "F" and then decreasing in size again, for insect spray. Filed May 11, 1950 by Milton Freed, doing business as the Milfred Company. Pittsburgh, Pa. Claims use since September 10, 1938.

AGRIMUL, in capital stencil letters, for insecticide emulsifier. Filed May 25, 1950 by Nopco Chemical Co., Harrison, N. J. Claims use since February 15, 1950.

Systox, in capital letters, for organic phosphate systemic insecticide for agricultural use. Filed May 26, 1950 by Geary Chemical Corp., New York, N. Y. Claims use since May 10, 1950.

SANOCIDE, in capital letters, for parasiticides - namely insecticides, and fungicides and herbicides. Filed June 5, 1950 by California Spray-Chemical Corporation, Wilmington, Del. Claims use since November, 1910.

MINOR L, the word minor in capital letters superimposed on the letter "L" and enclosed by a circle of chain with spikes protruding, for prepared chemical fertilizer. Filed April 13, 1950 by Farm Belt Fertilizer and Chemical Company, Kansas City, Kansas. Claims use since January 5, 1950.

PENCEL, in capital letters, for insecticides. Filed August 31, 1948 by the Pennsylvania Salt Manufacturing Company, Philadelphia, Pa. Claims use since July 23, 1948.

CHLORAX, in bold capital letters, for weed killing chemical. Filed February 1, 1949 by Chipman Chemical Company, Bound Brook, N. J. Claims use since November, 1945.

METHOXONE, in capital letters, for preparation for killing weeds. Filed June 2, 1950 by Imperial Chemical Industries, Ltd., London and Millbank, London, England, assignor to Plant Protection, Ltd., Valding, England.

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Entomologist: Manufacturer of insecticides and wood preservatives in South wants man to contact customers and experiment stations on product application work and to evaluate new products experimentally, also work with sales department. Give education, experience, personal information, photo and salary expected. Address Box No. 538, % Agricultural Chemicals.

Two Salesmen with agricultural background for sale of complete, top-quality line of insecticides, fungicides and herbicides to distributors—one for New England to Pennsylvania; one for Virginia, the Carolinas and Georgia. Straight salary and travelling expense. Travel about half of time. Write, giving full particulars of sales experience, territory covered and education. Your letter will be held in strict confidence. Address Box No. 539, % Agricultural Chemicals.

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tional manufacturer. Experienced, well rounded, individual who can advise management, assist salesmen through field-trip work, conduct technical development on new—old products. Unique position is that no other personnel is now so employed. Position has challenge and independence of small business with big-business security. Location in the East. All replies confidential. Address Box No. 540, % Agricultural Chemicals.

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Agricultural Sales or Service: Current graduate student 38, married, draft exempt would like to prove his ability to work with people other than in the classroom. Farm background and experience, training in Chemistry, Biology, Agriculture and Economics. 12 years of agricultural teaching experience. Address Box No. 541, % Agricultural Chemicals.

Sales Representative—Desires new position with manufacturer of agricultural chemicals. At present employed. Has covered East Central states and knows the formulators and others in trade well. Five years in present sales job with manufacturer of basic fungicide and insecticide materials. Graduate chemist. Married. Prefer eastern location but will go anywhere. For further details, write Box No. 542, % Agricultural Chemicals.

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## Washington Ag. Bulletin

A booklet presenting spray programs for tree fruits in Eastern Washington State has been issued by the State College of Washington, Pullman, as Extension Bulletin No. 419 (revised). Prominently featured in the booklet is a warning against careless use of organic phosphate insecticides, with full instructions about what to do in case of illness apparently caused by contact with these materials or their fumes.

Other chapters list dusting materials available for insect and plant disease control; schedules for spraying and dusting apples and pears; hormone sprays to control fruit drop; dormant sprays and control of fungus diseases.

# 1950 Cotton Damage Up

Damage from insects slashed almost 27 percent from the 1950 cotton yield in 13 states, the National Cotton Council has announced. Damage done by the boll weevil and other pests in 1950 has been exceeded only one time previously. (In 1921 the full yield was reduced an estimated 35.5 percent).

The council estimates the dollar value of cotton destroyed in '\$0 at \$907,884,000 — the highest in history. This exceeds by more than \$300,000,000 the preliminary unofficial estimate of last November.

In 1949, insects destroyed an estimated 3,825,871 bales of cotton and 1,576,000 tons of cottonseed valued at \$617,874,000. This was considerably under the 1950 loss, estimated at 3,892,682 bales and 1,591,000 tons of cottonseed. However, the gross total dollar damage was much greater last year because of increased value of both cotton and seed.

Reasons for the unusually-high insect damage in 1950, as given by the Cotton Council, were as follows:

1. Unusually large numbers of weevils surviving the mild winter;

2. The number of live weevils emerging in the spring of 1950 was at a record level;

3. frequent rains and below-average temperatures hindered pesticide application schedules;

4. maturity of the crop was delayed and heavy damage from weevils continued even on grown bolls.

Although losses in 1950 were staggering, the Council adds, it should be noted that damage would have been much greater had not the states carried out an intensified cotton insect control program. The Mississippi Agricultural Extension Service estimated that farmers in that state saved more than 100 million dollars through the proper use of insecticides. Sound insect control programs netted farmers substantial dividends in other Cotton Belt states while those who did not follow a recommended schedule suffered severe losses.

# Pacific Group to Seattle

The Edward Meany Hotel, Seattle, was to be the site of the 35th annual meeting of the Pacific Slope Branch of the American Association of Economic Entomologists June 19 to 21. According to R. S. Braucher, Dow Chemical Co., Great Western Division, topics for discussion on the program were to include systemic insecticides, recent developments in mite control and up-to-date information on application equipment. Entertainment for the ladies had been arranged also, it was indicated.

In addition to chairman Braucher, inembers of the arrangement committee are W. J. F. Francis, R. D. Eichman and Keith Sime.

# Wellings Heads A&S Dept.

William Wellings, Jr. was recently placed in charge of paper procurement of Arkell and Smiths, Canajoharie, N. Y., multiwall paper bag manufacturers.

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## about the editor-

Dr. Donald E. H. Frear, Editor of PESTICIDE HANDBOOK 1951, is one of the leading authorities on the chemistry of pesticides. He is the author of "Chemistry of Insecticides and Fungicides," the first book dealing with this subject published in the United States. In addition, he has written several other books, including "Chemistry of Insecticides, Fungicides, and Herbicides". Dr. Frear is Professor of Agricultural and Biological Chemistry at The Pennsylvania State College.

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# Tale Ends ...

GR heroism beyond the call of duty" might be a suitable inscription for medals presented to some unsung heroes of the Government services, who took part in the early, uncertain experimentation with DDT. The story comes to us of Dr. Paul A. Neal of the Public Health Service, Federal Security Agency, Washington, who is reported to have mixed DDT in corn oil and drank the solution to prove the general safety and lack of toxicity of the material.

This was during the days of World War II, when time was of utmost importance, and there was no opportunity to conduct experiments in the usual manner to determine how toxic the new insecticide might be to human beings.

Possibly members of the Delaney Committee and others delving into the possible hazards involved in the use of DDT and other toxicants, might find this item of interest.

Already in the Committee's record, however, is the testimony of

**NEW YORK 1** 

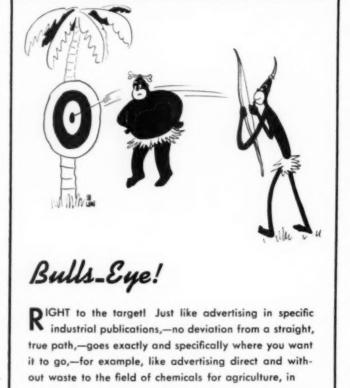
Dr. George C. Decker of Illinois, who told of a recent case at his University, where he and members of his family ate the meat of an animal which had been fed tremendous doses of DDT before being slaughtered.

And all of these people are still around to attest to the safety of DDT!

The Soviet Union announced in May that it has perfected "improved types of electronic machines for artificial rain." But the Russky rainmaker also has a fair weather use, it is claimed. The machines not only make rain, but also "mechanize the application of fertilizers and chemical substances for fighting weeds and vermin," the report states. Probably many of our readers would agree that such reports, rather than the machine mentioned, would make good fertilizer material of itself.

Australia is reported to be gaining ground in its 100 year-old war on the rabbit plague which is described as being worse than grasshoppers, drought or hoof-and-mouth disease. Its method is to spread the disease Myxamatosis among the bunnies via mosquitoes and sandflies. The illness, to which human beings are not susceptible, is said to have caused the death of millions of rabbits and is still going strong. A few inoculated rabbits released in an area soon spread the disease to others and so on, ad infinitum. The illness causes swelling of the head and rump of the bunnies, makes breathing so difficult that they soon die of suffocation.

A fellow in Los Angeles was given a sentence of from one to fourteen years for forgery and falsifications of records in the county auditor's office where he worked. His plea: not guilty because of "alcoholic insanity". A psychiatrist found that the defendant was addicted to drinking coffee flavored with moth balls. These insecticides again!



130

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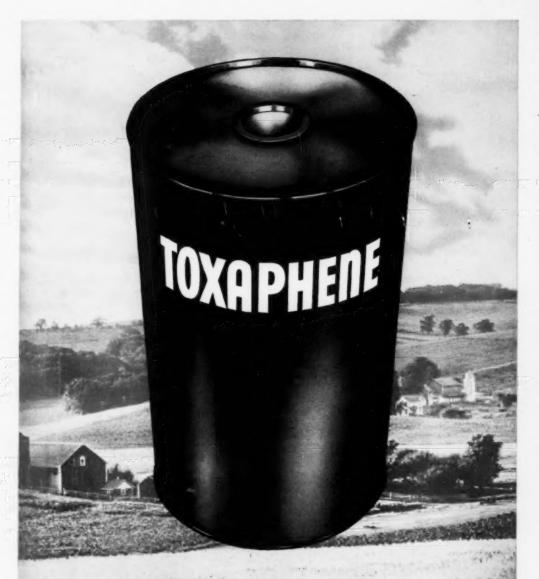
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